

Service Manual

TV/DVD Combination

CHASSIS : CP-099F

**Model : DDT-21H9ZZF
DDT-21H9ZZR**



DDT-21H9ZZF



DDT-21H9ZZR

DAEWOO ELECTRONICS CO., LTD

[http : //svc.dwe.co.kr](http://svc.dwe.co.kr)

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DAEWOO

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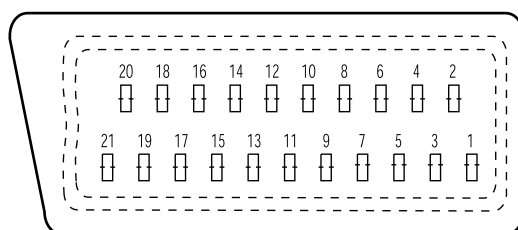
1- Main Features

1-1 Specifications

TV standard	PAL - SECAM B/G D/K, PAL, I/II, SECAM L/L'	
Sound system	NICAM B/G, I, D/K, L, FM 2Carrier B/G, D/K	
Power consumption	69W approx	
Sound Output Power	TV MODE : 3W min + 3W min DVD MODE : 3W min + 3W min	
Speaker	5W 8 ohm x2	
Teletext system	10 page memory FASTEXT (FLOF or TOP)	
Aerial input	75 ohm unbalanced	
Channel coverage	Off-air channels, S-cable channels and hyperband	
Tuning system	frequency synthesiser tuning system	
Visual screen	51 Cm	
Channel indication	On Screen Display	
Program Selection	100 programs (00~99)	
Aux. terminal	EURO SCART (AV1) : Auto / Video In and Out, R/G/B In, Slow and Fast switching. AUDIO OUT : DVD COAXIAL OUT and RCA Audio OUT at back of cabinet. AV2 : RCA Video In and Audio In on side of cabinet. EARPHONE : Jack on side of cabinet.	
Remote Control Unit	R-52B02	
	Laser	Semiconductor laser, wavelength 650nm
	Signal system	PAL 625/50, NTSC 525/60
	Frequency response (audio)	20 - 20,000Hz
CD/DVD	Signal-to-noise ratio(audio)	More than 60dB (1kHz)
	Signal-to-noise ratio(video)	More than 60dB (ABEX 50% white pattern)
	Dynamic range (audio)	60dB
	Harmonic distortion(audio)	0.3% (1kHz)

EURO SCART

Pin	Signal Description	Matching value
1□	Audio out (linked with 3)	0.5Vrms, lmp < 1kΩ (RF 60% MOD)
2□	Audio In (linked with 6)	0.5Vrms, lmp < 10kΩ
3□	Audio out (linked with 1)	0.5Vrms, lmp < 1kΩ (RF 60% MOD)
4□	Audio Earth	
5□	Blue Earth	
6□	Audio In (linked with 2)	0.5Vrms, lmp < 10kΩ
7□	Blue In	0.7Vp-p ±10%, lmp 75Ω
8□	Slow (Function) Switching	TV : 0~2V, AV 16/9 : 4.5~7 V, AV 4/3 : 9.5~12 V, lmp > 10kΩ
9□	Green Earth	
10□	NC	
11□	Green In	0.7Vp-p ±10%, lmp 75Ω
12□	NC	
13□	Red Earth	0.7Vp-p ±10%, lmp 75Ω
14□	NC	
15□	Red In	0.7Vp-p ±10%, lmp 75Ω
16□	Rapid Blanking, Switching	Logic 0 : 0~0.4V, Logic 1 : 1~3V, lmp 75Ω
17□	Video Earth	
18□	Rapid Blanking Earth	
19□	Video Out	1.0Vp-p ±10%, lmp 75Ω
20□	Video In	1.0Vp-p ±10%, lmp 75Ω
21	Common Earth	



AV2 (RCA AUDIO-VIDEO INPUT)

1	VIDEO IN	1Vpp ±3dB, Impedance 75ohm
2	L IN	0.5Vrms, Impedance > 10kohm
3	R IN	0.5Vrms, Impedance > 10kohm

1-2 Channel table

FREQUENCY TABLE

CH	EUROPE CCIR	FRANCE	GB(IRELAND)	EAST OIRT
C01	46.25	-	47.75	49.75
C02	48.25	55.75 (L')	53.75	59.25
C03	55.25	60.5 (L')	61.75	77.25
C04	62.25	63.75 (L')	175.25	85.25
C05	175.25	176.00	183.25	93.25
C06	182.25	184.00	191.25	175.25
C07	189.25	192.00	199.25	183.25
C08	196.25	200.00	207.25	191.25
C09	203.25	208.00	215.25	199.25
C10	210.25	216.00	223.25	207.25
C11	217.25	189.25 (LUX)	231.25	215.25
C12	224.25	69.25 (L')	239.25	223.25
C13	53.75	76.25 (L')	247.25	-
C14	-	83.25 (L')	49.75	-
C15	82.25	90.25	57.75	-
C16	-	97.25	65.75	-
C17	183.75	-	77.75	-
C18	192.25	-	85.75	-
C19	201.25	-	-	-
C20	-	-	-	-
C21	471.25	471.25	471.25	471.25
C22	479.25	479.25	479.25	479.25
C23	487.25	487.25	487.25	487.25
C24	495.25	495.25	495.25	495.25
C25	503.25	503.25	503.25	503.25
C26	511.25	511.25	511.25	511.25
C27	519.25	519.25	519.25	519.25
C28	527.25	527.25	527.25	527.25
C29	535.25	535.25	535.25	535.25
C30	543.25	543.25	543.25	543.25
C31	551.25	551.25	551.25	551.25
C32	559.25	559.25	559.25	559.25
C33	567.25	567.25	567.25	567.25
C34	575.25	575.25	575.25	575.25
C35	583.25	583.25	583.25	583.25
C36	591.25	591.25	591.25	591.25
C37	599.25	599.25	599.25	599.25
C38	607.25	607.25	607.25	607.25
C39	615.25	615.25	615.25	615.25
C40	623.25	623.25	623.25	623.25
C41	631.25	631.25	631.25	631.25
C42	639.25	639.25	639.25	639.25
C43	647.25	647.25	647.25	647.25
C44	655.25	655.25	655.25	655.25
C45	663.25	663.25	663.25	663.25
C46	671.25	671.25	671.25	671.25
C47	679.25	679.25	679.25	679.25
C48	687.25	687.25	687.25	687.25
C49	695.25	695.25	695.25	695.25
C50	703.25	703.25	703.25	703.25
C51	711.25	711.25	711.25	711.25
C52	719.25	719.25	719.25	719.25
C53	727.25	727.25	727.25	727.25
C54	735.25	735.25	735.25	735.25
C55	743.25	743.25	743.25	743.25
C56	751.25	751.25	751.25	751.25
C57	759.25	759.25	759.25	759.25

CH	EUROPE CCIR	FRANCE	GB(IRELAND)	EAST OIRT
C58	767.25	767.25	767.25	767.25
C59	775.25	775.25	775.25	775.25
C60	783.25	783.25	783.25	783.25
C61	791.25	791.25	791.25	791.25
C62	799.25	799.25	799.25	799.25
C63	807.25	807.25	807.25	807.25
C64	815.25	815.25	815.25	815.25
C65	823.25	823.25	823.25	823.25
C66	831.25	831.25	831.25	831.25
C67	839.25	839.25	839.25	839.25
C68	847.25	847.25	847.25	847.25
C69	855.25	855.25	855.25	855.25
C70	863.25	863.25	863.25	863.25
C71	69.25	-	-	-
C72	76.25	-	-	-
C73	83.25	-	-	-
C74	90.25	-	-	-
C75	97.25	-	-	-
C76	59.25	-	-	-
C77	93.25	-	-	-
S01	105.25	104.75	103.25	105.25
S02	112.25	116.75	111.25	112.25
S03	119.25	128.75	119.25	119.25
S04	126.25	140.75	127.25	126.25
S05	133.25	152.75	135.25	133.25
S06	140.25	164.75	143.25	140.25
S07	147.25	176.75	151.25	147.25
S08	154.25	188.75	159.25	154.25
S09	161.25	200.75	167.25	161.25
S10	168.25	212.75	-	168.25
S11	231.25	224.75	-	231.25
S12	238.25	236.75	-	238.25
S13	245.25	248.75	255.25	245.25
S14	252.25	260.75	263.25	252.25
S15	259.25	272.75	271.25	259.25
S16	266.25	284.75	279.25	266.25
S17	273.25	296.75	287.25	273.25
S18	280.25	136.00	295.25	280.25
S19	287.25	160.00	303.25	287.25
S20	294.25	-	-	294.25
S21	303.25	303.25	-	303.25
S22	311.25	311.25	311.25	311.25
S23	319.25	319.25	319.25	319.25
S24	327.25	327.25	327.25	327.25
S25	335.25	335.25	335.25	335.25
S26	343.25	343.25	343.25	343.25
S27	351.25	351.25	351.25	351.25
S28	359.25	359.25	359.25	359.25
S29	367.25	367.25	367.25	367.25
S30	375.25	375.25	375.25	375.25
S31	383.25	383.25	383.25	383.25
S32	391.25	391.25	391.25	391.25
S33	399.25	399.25	399.25	399.25
S34	407.25	407.25	407.25	407.25
S35	415.25	415.25	415.25	415.25
S36	423.25	423.25	423.25	423.25
S37	431.25	431.25	431.25	431.25
S38	439.25	439.25	439.25	439.25
S39	447.25	447.25	447.25	447.25
S40	455.25	455.25	455.25	455.25
S41	463.25	463.25	463.25	463.25

1-3 ATSS sorting method

The TV set sweeps all the TV bands from beginning of VHF to end of UHF. The TV controlling software for each program checks if a VPS CNI code is transmitted (this system exists for German, Swiss and Austrian transmissions). If no VPS CNI code is found then the system check if a CNI code is transmitted as part of the teletext transmission (Packet 8/30 format 1). If such a code (VPS or teletext) is found and if this code is in the ATSS list, the program is automatically named.

If the transmission does not have VPS CNI, and no teletext service is available, then there is no possibility of the program being automatically named.

The programs found are then sorted in 4 groups :

Group I : It contains all the pro grams from the selected country and named by the TV controlling software. Within this group the sorting order is fixed by the ATSS list.

Group II : It contains all the pro grams with a strong signal strength which are not listed in group I.

Group III : It contains all the pro grams with a weak signal strength which are not listed in group I.

Group IV : If two or more programs with the same code are found, only the strongest (or if they have the same level the one with the lowest frequency) is listed in group I, II or III. The others are listed in group IV.

Program number	Group	Skip
1	Group I	
2		
...		
n		
n+1	Group II	
...		
m		
m+1		
...	Group III	
p		
p+1		
...	Group IV	✓
q		
q+1		
...	not used	✓
99		
0		

Program number	Group	Skip
1	Group II	
...		
m		
m+1	Group III	
...		
p		
p+1	Group IV	✓
...		
q		
q+1	not used	✓
...		
99		
0		

Special case : **Country selection = Others**

Special case : **France**

Note : If two programs with the same name but a different code are found these two programs are listed in group I, II or III (e.g. Regional program SW3 in Germany).

The sorting order within group II, III, and IV is based on the channel frequency. The Program with the lowest frequency is allocated the first rank in its group, and so forth until the last program of the group which has the highest frequency.

Special case : **France**

If France is selected, the TV controlling software sweeps all TV bands with France system selected firstly (positive video modulation) and the second time with Europe system selected (negative video modulation).

Special case : **Switzerland**

If Switzerland is selected the TV controlling software sweeps all TV bands with Europe system selected firstly (negative video modulation) and the second time with France system selected (positive video modulation).

Special case : GB

Note for satellite receiver users : Before starting ATSS turn On your satellite receiver and tune “ SKY NEWS ”.
If GB is selected the TV controlling software seeks for programs only in UHF (C21 to C70).

The sorting order is :

- 1 - BBC1
- 2 - BBC2
- 3 - ITV
- 4 - CH4
- 5 - CH5
- 6 - NEWS

If two or more “ identical” programs (same name but different code e.g. BBC1 and BBC1 Scotland) are found the following programs in the list will be shifted up. (1 - BBC1, 2 - BBC1, 3 - BBC2, 4 -ITV, 5 - CH4, 6 - CH5, 7 - NEWS, ..)

If one of the program above is not found, the associated program number remains empty
(freq.=467.25 Mhz - Skip selected - no name - system=GB).

example A : 1 - BBC1, 2 - BBC2, 3 - ITV , 4 - ----, 5 - CH5, 6 - NEWS , ...

example B (if 2 BBC1 found) : 1 - BBC1, 2 - BBC1, 3 - BBC2, 4 - IT V, 5 - -----, 6 - CH5, 7 -NEWS, ...

2 - Safety instruction

WARNING: Only competent service personnel may carry out work involving the testing or repair of this equipment.

X-RAY RADIATION PRECAUTION

1. Excessive high voltage can produce potentially hazardous X-RAY RADIATION. To avoid such hazards, the high voltage must not exceed the specified limit. The nominal value of the high voltage of this receiver is 27.5 KV (21”) at max beam current. The high voltage must not, under any circumstances, exceed 31 KV (21”). Each time a receiver requires servicing, the high voltage should be checked.

It is important to use an accurate and reliable high voltage meter.

2. The only source of X-RAY Radiation in this TV receiver is the picture tube. For continued X-RAY RADIATION protection, the replacement tube must be exactly the same type tube as specified in the parts list.

SAFETY PRECAUTION

1. Potentials of high voltage are present when this receiver is operating. Operation of the receiver outside the cabinet or with the back board removed involves a shock hazard from the receiver.
 - 1) Servicing should not be attempted by anyone who is not thoroughly familiar with the precautions necessary when working on high voltage equipment.
 - 2) Discharge the high potential of the picture tube before handling the tube. The picture tube is highly evacuated and if broken, glass fragments will be violently expelled.
2. If any Fuse in this TV receiver is blown, replace it with the FUSE specified in the Replacement Parts List.
3. When replacing a high wattage resistor (metal oxide film resistor) in the circuit board, keep the resistor 10 mm away from circuit board.
4. Keep wires away from high voltage or high temperature components.
5. This receiver must operate under AC 230 volts, 50 Hz. NEVER connect to DC supply or any other power or frequency.

PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in this equipment have special safety-related characteristics.

These characteristics are often passed unnoticed by a visual inspection and the X-RAY RADIATION protection afforded by them cannot necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this manual and its supplements, electrical components having such features are identified by designated symbol on the parts list. Before replacing any of these components, read the parts list in this manual carefully. The use of substitutes replacement parts which do not have the same safety characteristics as specified in the parts list may create X-RAY Radiation.

LASER SAFETY

This unit employs a laser. Only qualified service personnel should remove the cover or attempt to service this device due to possible eye injury.

CAUTION : Use of any controls, adjustments, or procedures other than those specified herein may result in hazardous radiation exposure.

3 - Alignment instructions

3-1 Microcontroller configuration : Service mode

To switch the TV set into service mode please see instruction below.

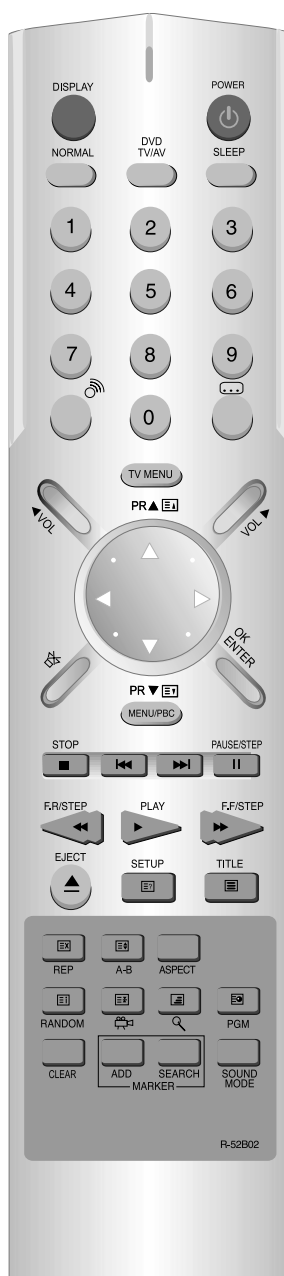
- 1 - Select pr. number 91
- 2 - Adjust sharpness to minimum and exit all menu.
- 3 - Quickly press the key sequence : **RED - GREEN - menu**

To software version is displayed beside the word Service, e.g. "FACTORY V0.00".

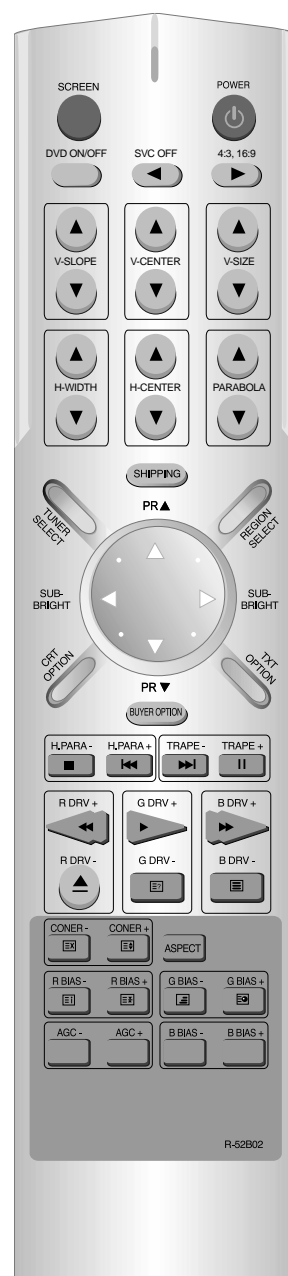
To exit SERVICE menu press TV/AV/DVE key or POWER OFF

3-2 Service mode navigation

NAME	AFTER SVC MODE
POWER	STAND BY <=> POWER ON
PR UP	PR UP
PR DOWN	PR DOWN
VOL UP	REGION SELECT
VOL DOWN	TUNER SELECT
CURSOR	SUB-BRT UP
CURSOR	SUB-BRT DOWN
TV MENU	SHIPPING
MENU/PBC	BUYER SELECT
OPEN/COLSE	P.DRIVE -
ZOOM	G BIAS -
SETUP	G. DRIVE -
PAUSE	TRAPEZIUM +
SKIP-F:NEXT	TRAPEZIUM -
SKIP-B:PREVIOUS	H PARA +
FAST-F / SLOW	B.DRIVE +
FAST-R / SLOW	R DRIVE +
REPEAT	CONER -
A-B REPEAT	CONER +
PLAY	G.DRIVE +
STOP	H.PARA -
RANDOM	R.BIAS -
ANGLE	R.BIAS +
PROGRAM	G.BIAS +
AUDIO	H-WIDTH -
SUBTITLE	PARABOLA -
OK / ENTER	TXT OPTION
RECALL / DISPLAY	SCREEN
TITLE	B.DRIVE -
SLEEP	4:3, 16:9
TV/AV/DVD	SVC OFF
NORMAL	DVD ON/OFF
MUTE(SYMBOL)	CRT OPTION
CLEAR	AGC -
ADD	AGC +
SERCH	B.BIAS -
SOUND MODE	B.BIAS +
0	H.CENTER -
1	V.SLOPE +
2	V.CENTER +
3	V.SIZE +
4	V.SLOPE -
5	V.CENTER -
6	V.SIZE -
7	H.WIDTH +
8	H.CENTER +
9	PARABOLA +
ASPECT	



NORMAL MODE



SERVICE MODE

3-3 Microcontroller configuration : Option bits

These option bits are available from Service mode. Please refer to previous page's diagram of the AFTER SERVICE state. The table below shows the options available ;

	B7	B6	B5	B4	B3	B2	B1	B0
1	TOP text off	FASTEXT /FLOF off	00 PHILIPS CRT 10 THOMSON CRT		Buyer option	Aspect option	Tuner options 00 = Philips 11 = Daewoo, Samsung	
0	TOP text on	FASTEXT (FLOF) on	11 SAMSUNG CRT					

REGION SELECT : Go to SERVICE MODE and push the REGION SELECT key.

DVD UPGRADE : Go to SERVICE MODE and push DVD ON , SVC OFF. Then insert the UPGRADE CD.

Upgrde is doing automatically.

For a while, push the power switch off after screen is twinkled.

Then switch on, upgrde is done perfectly.

3-4 TV set Alignment

CAUTION) All of the below keys are SERVICE MODE'S keys.

Please refer to AFTER SERVICE MODE diagram p.p10.

3-4-1- The adjustment of screen

- Go to SERVICE MODE and adjust SUB BRIGHT at below datas.

(Setting data -- Philips CRT : 30, Thomson CRT : ?, Samsung CRT : ?)

In case of mass production in the factory, keeping the setting data value to EEPROM MASTER IC for setting of sub-bright.

- Press the SCREEN key on the service remote control so that make the horizontal line.

- Adjust the screen volume of the FBT so that the horizontal line may be minimum light.

- Press the SCREEN key on the SVC remocon to release SCREEN mode.

3-4-2- The adjustment of focus

- Apply PAL RETMA pattern.

- Adjust with the focus volume on the FBT until you get the most clear resolution line on the screen.

3-4-3- The adjustment of white balance

- Go to SERVICE MODE.

- Adjust with G DVR +/-, B DVR +/- keys so that only G,B bars in the low beam on the instrument may be located in the center.

- The reference coordinates are X=288, Y=301

3-5 The adjustment of geometry

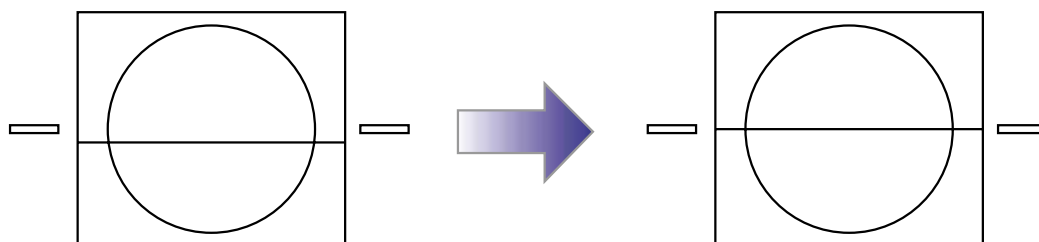
3-5-1- The adjustment of vertical center

- Apply PAL RETMA pattern.

- Go to SERVICE MODE.

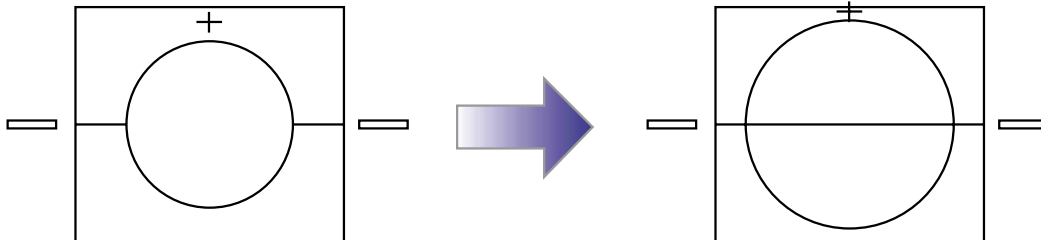
- Press V-CEN+ or V-CEN- key and "VERT CENT" OSD will be displayed.

- Adjust with V-CEN+/V-CEN- keys so that the center mark of the CRT may be located on the horizontal line in the middle of the pattern. In case of no center mark, adjust with V-CEN+/V-CEN- keys to obtain a vertical symmetric pattern.



3-5-2- The adjustment of vertical size

- Apply PAL RETMA pattern.
- Go to SERVICE MODE.
- Press V-SIZE+ or V-SIZE- key and "VERT SIZE" OSD will be displayed.
- Adjust with V-SIZE+/V-SIZE- keys so that the upper and the lower '+' marks of the RETMA pattern may be located at the boundaries of the screen.



3-5-3- The adjustment of vertical slope

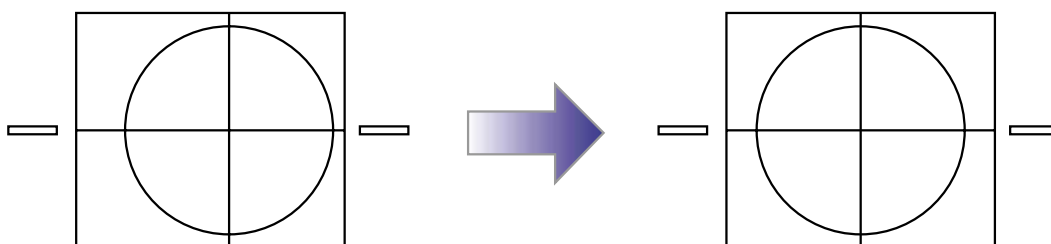
- Apply PAL RETMA pattern.
- Go to SERVICE MODE.
- Press V-SLOPE+ or V-SLOPE- key and "V. LINEAR" OSD will be displayed.
- Referring to the upper side and lower side, adjust with V-SLOPE+/V-SLOPE- keys so that RETMA pattern may be symmetrical.
- In case of mass production in the factory, keeping the default value is recommended for the adjustment of V-SLOPE.
Default value : -00005

3-5-4- The adjustment of S-correction

- Apply PAL CROSS HATCH pattern.
- Go to SERVICE MODE.
- Press S-CUR+ or S-CUR- key and "S CORRECT" OSD will be displayed.
- Adjust with S-CUR + or S-CUR- keys so that the upper, the lower and the middle size of the CROSS HATCH pattern may be same size.
- In case of mass production in the factory, keeping the default value is recommended for the adjustment of S-correction.
Default value : -00020

3-5-5- The adjustment of horizontal center

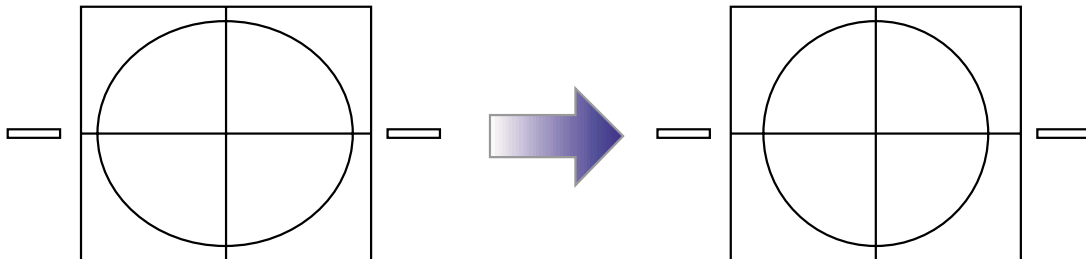
- Apply PAL RETMA pattern.
- Go to SERVICE MODE.
- Press H-CENTER+ or H-CENTER- key and "HOR CEN" OSD will be displayed.
- Referring to the both side scales, adjust with H-CENTER+/H-CENTER- keys so that RETMA pattern may be symmetrical.



3-5-6- The adjustment of horizontal width

Adjust Horizontal width only CRT of non pin free and don't adjust Horizontal width CRT of pin free.

- Apply PAL RETMA pattern.
- Go to SERVICE MODE.
- Press H-WIDTH+/H-WIDTH- key and "H WIDTH" OSD will be displayed.
- Referring to the both side scales, adjust with H-WIDTH+/H-WIDTH- keys so that RETMA pattern may be OVER Scan 10%.

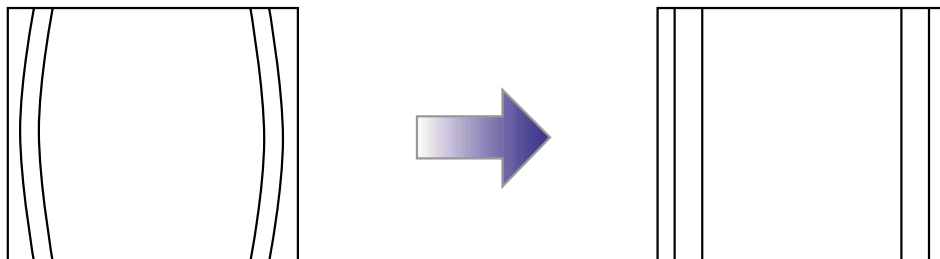


3-5-7- The adjustment of pincusion

Adjust Pincusion only CRT of non pin free and don't adjust Pincusion CRT of pin free.

3-5-7-1 The adjustment of parabola

- Apply PAL CROSS HATCH pattern.
- Go to SERVICE MODE.
- Press PARA▲ or PARA ▼ key and "PARABOLA" OSD will be displayed.
- Adjust Parabola Width with PARA▲ or PARA ▼ key.

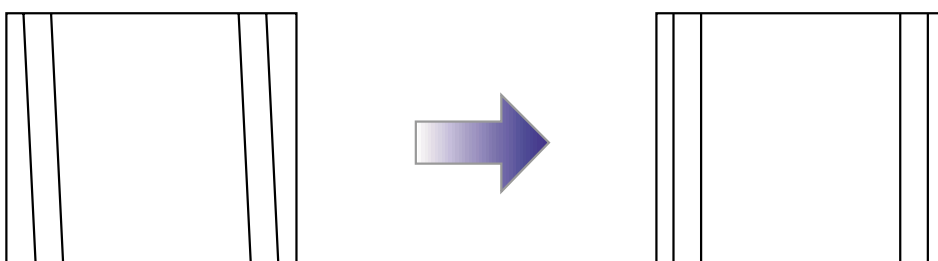


3-5-7-2 The adjustment of corner

- Apply PAL CROSS HATCH pattern.
- Go to SERVICE MODE.
- Press COR-T▲ or COR-T ▼ key and "CORNER" OSD will be displayed.
- Adjust Parabola Corner with COR-T▲ or COR-T ▼ key.
- In case of mass production in the factory, keeping the default value is recommended for the adjustment of CORNER.
Default Value : +00000

3-5-7-3 The adjustment of H.parabola

- Apply PAL CROSS HATCH pattern.
- Go to SERVICE MODE.
- Press H.PARALL▲ or H.PARALL ▼ key and "HOR PARAL" OSD will be displayed.
- Adjust Parabola Corner with H.PARALL▲ or H.PARALL ▼ key.
- In case of mass production in the factory, keeping the default value is recommended for the adjustment of CORNER.
Default Value : +00022

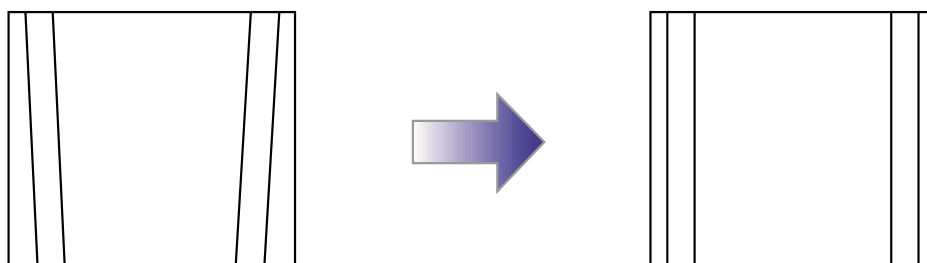


3-5-7-4 The adjustment of H.bow

- Apply PAL CROSS HATCH pattern.
- Go to SERVICE MODE.
- Press H.BOW ▲ or H.BOW ▼ key and "H.BOW" OSD will be displayed.
- Adjust Parabola Width with H.BOW ▲ or H.BOW ▼ key.
- In case of mass production in the factory, keeping the default value is recommended for the adjustment of H.bow
Default value : -00000

3-5-7-5 The adjustment of EW TRAPEZIUM

- Apply PAL CROSS HATCH pattern.
- Go to SERVICE MODE.
- Press EW TRAPEZ ▲ or EW TRAPEZ ▼ key and "EW TRAPEZ" OSD will be displayed.
- Adjust Parabola Width with EW TRAPEZ ▲ or EW TRAPEZ ▼ key.
- In case of mass production in the factory, keeping the default value is recommended for the adjustment of EW TRAPEZ
Default value : +00060



3-6 The adjustment of RF AGC

- Apply PAL signal of $60 \pm 2\text{dB}\mu\text{V}$ of RF level.
- Connect the probe of the oscilloscope to the P101 #3pin (TUNER AGC INPUT)
- Go to SERVICE MODE.
- Adjust with the COR-B UP/DOWN keys on the service remote control so that the DC voltage may have the value reduced by $1.0 \pm 0.2\text{Vdc}$ from
- In case of mass production in the factory, keeping the default value is recommended for the adjustment of AGC
Default value : 14

3-7 Setting the conditions for finished products

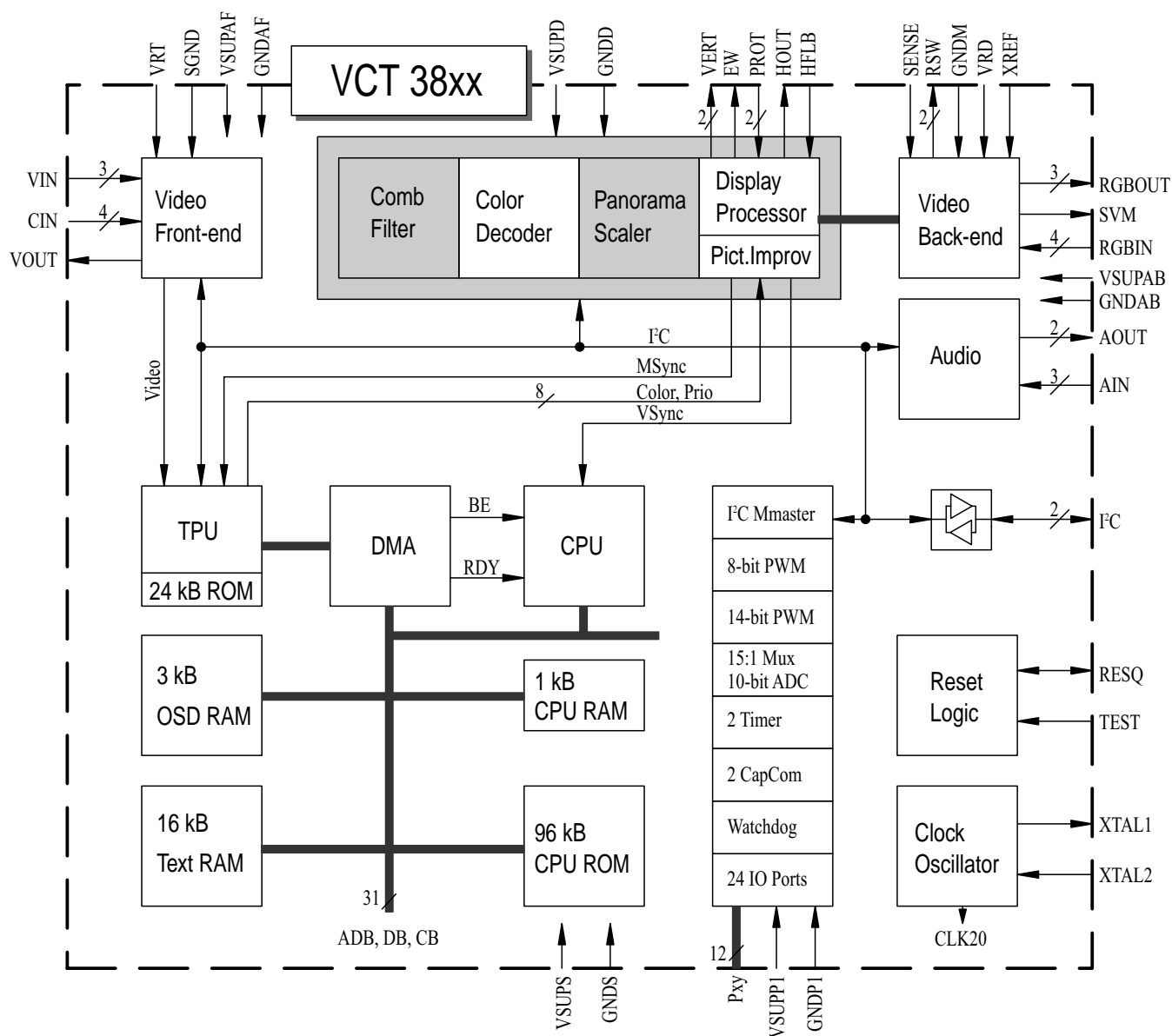
- Go to SERVICE MODE.
 - Press the upper SHIPPING key on the SVC MODE REMOCON to set the conditions for the finished products.
- For the reference, the predesignated values are as follows.

PICTURE	NORMAL-1	Pr.	01
SOUND	NORMAL	Wake up	Off
NR	Off	Child Lock	Off
BALANCE	Center		
VOLUME	21/63		

4 - IC description

4-1 VCT383XA TV signal processor - Teletext decoder with embedded 8 bit μ - Controller.

4-1-1- Block diagram of the VCT



4-1-2- TV-signal Processor

Four composite video inputs, two S-VHS inputs

Analogue YC r C b input

Composite video monitor

Multistandard colour decoder (1 crystal)

Multistandard sync decoder

Black-line detector

Adaptive 2H comb filter Y/C separator

- Horizontal scaling (0.25 to 4)
- Panoramavision
- Black-level expander
- Dynamic peaking
- Soft limiter (gamma correction)
- Colour transient improvement
- Programmable RGB matrix
- Analogue RGB/Fastblank input
- Half-contrast switch
- Picture frame generator
- Scan velocity modulation output
- High-performance H/V deflection
- Angle and bow correction
- Separate ADC for tube measurements
- EHT compensation

4-1-3- μ -Controller

- 8-bit, 10-Mhz CPU (65C02)
- 96 kB program ROM on chip
- 1 kB program RAM on chip
- memory banking
- 16-input, 16-level interrupt controller
- patch module for 10 ROM locations
- two 16-bit reloadable timers
- capture compare module
- watchdog timer
- 14-bit PWM for voltage synthesis
- Four 8-bit PWMs
- 10-bit ADC with 15:1 input MUX
- I2C bus master interface
- 24 programmable I/O ports
- 80C51 μ -controller core standard instruction set and timing
- 1 μ s machine cycle
- 32-128Kx8-bit late programmed ROM
- 3-12Kx8-bit Auxiliary RAM (shared with Display and Acquisition)
- Interrupt controller for individual enable/disable with two level priority
- Two 16-bit Timer/Counter registers
- WatchDog timer
- Auxiliary RAM page pointer
- 16-bit Data pointer
- IDLE and Power Down (PD) mode
- 14 bits PWM for Voltage Synthesis Tuning
- 8-bit A/D converter
- 4 pins which can be programmed as general I/O pin, ADC input or PWM (6-bit) output

4-1-4- Teletext Features

- Four programmable video inputs
- Adaptive data slicer
- Signal quality detection
- WST, PDC, VPS, and WSS acquisition

- High-level command language
- FLOF (Fastext), and TOP support
- 10 pages memory on chip (10kB)

4-1-5- Display OSD Features

- 3kB OSD RAM on chip
- WST level 1.5 compliant
- WST level 2 parallel attributes
- 32 foreground/background colours
- programmable colour look-up table
- 1024 mask programmable characters
- 17 national languages
- (Latin, Cyrillic and Greek character sets)
- Character matrix 10x10
- 4-color mode for user font

4-1-6- Audio Features

- Three mono inputs
- Two mono outputs
- Programmable channel select
- Volume control for one mono channel

4-1-7- General Features

- Submicron CMOS technology
- Low-power standby mode
- Single 20.25 MHz crystal
- 64-pin PSDIP package

4-1-8- Data Capture

The Video Front End section takes in the analogue Composite Video and Blanking Signal (CVBS), and from this extracts the required data, which is then decoded and stored in memory.

The extraction of the data is performed in the digital domain. The first stage is to select and convert the analogue CVBS signal into a digital form. This is done using 8 bit ADC sampling at 20.25 Mhz.

The digital data services transmitted in the VBI are selected and acquired separately from the video part. This is done by the use of an adaptive data slicer. The following data types can be extracted : 625 line World System Teletext (WST), VPS, WSS. The data is acquired and decoded by the teletext decoder (TPU), then stored in an SRAM Interface.

4-1-9- Data Capture Features

- Video Signal Quality detector
- Data Capture for 625 line WST
- Data Capture for VPS data (PDC system A)
- Data Capture for Wide Screen Signalling (WSS) bit decoding
- Real-time capture and decoding for WST Teletext in Hardware, to enable optimised microprocessor throughout
- 10 page memory stored On-Chip

- Inventory of transmitted Teletext pages stored in the Page Table
- Signal quality detector for WST data
- Comprehensive Teletext language coverage
- Full Field Vertical Blanking Interval (VBI) data capture of WST data

4-1-10- TV processor version and μ Controller capacity

IC version	VCT 3834A
8 bit μ -controller	✓
ROM size	96k
RAM size	1k
PAL decoder	✓
SECAM decoder	✓
NTSC decoder	✓
Picture improvement	✓
Teletext page memory	10 pages
Adaptive Comb filter	✓
Panorama Scaler	✓

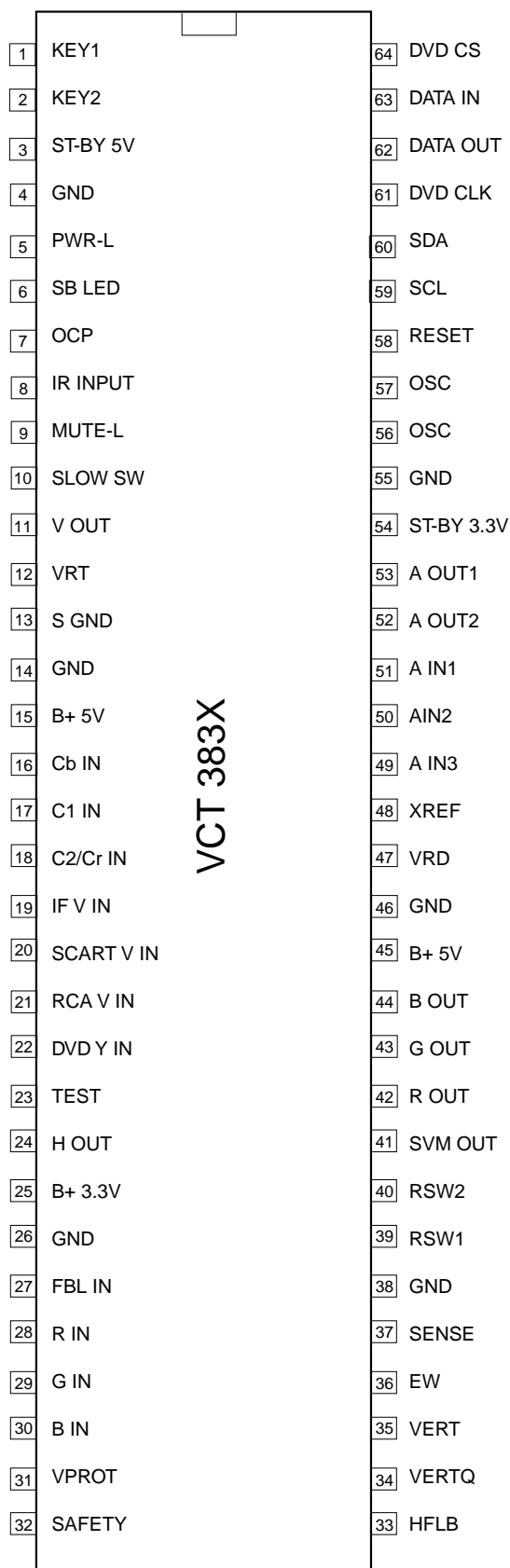
4-1-11- IC marking and version

Chassis	IC marking	OSD languages	ATSS countries	Text
CP-099F	VCT3834	English, French, German, Italian, Spanish, Dutch, Danish, Finnish, Norwegian, Swedish, Greek, Polish, Hungarian Romanian, Russian.	GB, France, Germany, Italy, Belgium, Spain, Austria, Poland, Switzerland, Denmark, Finland, Netherlands, Norway, Sweden, Ireland, Hungary, Czech Republic, Others	Pan-European Latin. Cyrillic, Greek.

4-1-12- Pinning

PSDIP 64-pin	Pin Name	Type	Short Description
1	KEY1	IN	
2	KET2	IN	
3	ST-BY 5V	SUPPLY	
4	GND	SUPPLY	GROUND PORT
5	PWR-L	OUT	LOW-SMPS ON, HIGH-SMPS IN STAND BY MODE
6	SB LED	OUT	HIGH-RED, LOW-GREEN
7	OCF	IN	OVER CURRENT PROTECTION INPUT
8	IR INPUT	IN	
9	MUTE-L	OUT	LOW-MUTE HIGH, HIGH-MUTE LOW
10	SLOW SW	IN	SCART SLOW SWITCH INPUT
11	V OUT	NOT USED	
12	VRT	IN	REFERENCE VOLTAGE TOP
13	S GND	SUPPLY	SINAL GROUND FOR ANALOG INPUT

PSDIP 64-pin	Pin Name	Type	Short Description
14	GND	SUPPLY	
15	B+ 5V	SUPPLY	
16	Cb IN	IN	ANALOG COMPONENT Cb INPUT
17	C1 IN	NOT USED	ANALOG CHROMA 1 INPUT
18	C2/Cr IN	IN	ANALOG CHROMA 2 INPUT/ANALOG COMPONENT Cr INPUT
19	IF V IN	IN	IF VIDEO SIGNAL INPUT
20	SCART V IN	IN	SCART VIDEO SIGNAL INPUT
21	RCA V IN	IN	RCA VIDEO SIGNAL INPUT
22	DVD Y IN	IN	DVD LUMINANCE(Y) COMPONENT INPUT
23	TEST	NOT USED	
24	H OUT	OUT	HORIZONTAL DRIVE OUTPUT
25	B+ 3.3V	SUPPLY	
26	GND	SUPPLY	
27	FBL IN	IN	FAST BLANK INPUT
28	R IN	IN	ANALOG RED INPUT
29	G IN	IN	ANALOG GREEN INPUT
30	B IN	IN	ANALOG BLUE INPUT
31	VPROT	IN	VETICAL PROTECTION INPUT
32	SAFETY	SUPPLY	SAFETY INPUT
33	HFLB	IN	HORIZONTAL FLYBACK INPUT
34	VERTQ	OUT	DIFFERENTIAL VERTICAL SAWTOOTH OUTPUT
35	VERT	OUT	DIFFERENTIAL VERTICAL SAWTOOTH OUTPUT
36	EW	OUT	VERTICAL PARABOLA OUTPUT
37	SENSE	IN	SENSE ADC INPUT
38	GND	SUPPLY	
39	RSW1	OUT	RANGE SWITCH1 FOR MESUREMENT ADC
40	RSW2	OUT	RANGE SWITCH2 FOR MESUREMENT ADC
41	SVM OUT	OUT	SCAN VELOCITY MODULATION OUTPUT
42	R OUT	OUT	ANALOG RED OUTPUT
43	G OUT	OUT	ANALOG GREEN OUTPUT
44	B OUT	OUT	ANALOG BLUE OUTPUT
45	B+ 5V	SUPPLY	
46	GND	SUPPLY	
47	VRD	IN	DAC REFERENCE
48	XREF	IN	REFERENCE INPUT FOR RGB DACs
49	A IN3	IN	ANALOG AUDIO 3 INPUT
50	A IN2	IN	ANALOG AUDIO 2 INPUT
51	A IN1	IN	ANALOG AUDIO 1 INPUT
52	A OUT2	OUT	ANALOG AUDIO 2 OUTPUT
53	A OUT1	OUT	ANALOG AUDIO 1 OUTPUT
54	ST-BY 3.3V	SUPPLY	
55	GND	SUPPLY	
56	OSC	OUT	
57	OSC	IN	
58	RESET	IN	RESET INPUT
59	SCL	OUT	IIC BUS CLOCK
60	SDA	IN/OUT	IIC BUS DATA
61	DVD CLK	IN	DVD CLOCK
62	DATA OUT	OUT	DVD DATA OUT
63	DATA IN	IN	DVD DATA IN
64	DVD CS	IN	DVD CS



4-2 MSP341x Multistandard Sound Processor

The MSP 341x is designed as a single-chip Multistandard Sound Processor for applications in analogue and digital TV sets, video recorders, and PC cards.

MSP 341x features :

- sound IF input
- No external filters required
- Stereo baseband input via integrated AD converters
- Two pairs of DA converters
- Two carrier FM or NICAM processing
- AVC : Automatic Volume Correction
- Bass, treble, volume processing
- Full SCART in/out matrix without restrictions
- Improved FM-identification
- Demodulator short programming
- Autodetection for terrestrial TV - sound standards
- Precise bit-error rate indication
- Automatic switching from NICAM to FM/AM or vice versa
- Improved NICAM synchronisation algorithm
- Improved carrier mute algorithm
- Improved AM-demodulation
- Reduction of necessary controlling
- Less external components

4-2-1- Basic Features of the MSP 341x

4-2-1-1 Demodulator and NICAM Decoder Section

The MSP 341x is designed to simultaneously perform digital demodulation and decoding of NICAM-coded TV stereo sound, as well as demodulation of FM or AM mono TV sound. Alternatively, two carrier FM systems according to the German terrestrial specs can be processed with the MSP 341x.

The MSP 341x facilitates profitable multistandard capability, offering the following advantages:

- Automatic Gain Control (AGC) for analogue input: input range: 0.10 - 3 Vpp
- integrated A/D converter for sound-IF input
- all demodulation and filtering is performed on chip and is individually programmable
- easy realisation of all digital NICAM standards (B/G, I, L and D/K)
- FM-demodulation of all terrestrial standards (include identification decoding)
- no external filter hardware is required
- only one crystal clock (18.432 MHz) is necessary

- high deviation FM-mono mode (max. deviation: approx. ± 360 kHz)

4-2-1-2 DSP-Section (Audio Baseband Processing)

- flexible selection of audio sources to be processed
- performance of terrestrial de-emphasise systems (FM, NICAM)
- digitally performed FM-identification decoding and de-emphasis
- digital baseband processing: volume, bass, treble
- simple controlling of volume, bass, treble

4-2-1-3 Analogue Section

- two selectable analogue pairs of audio baseband input (= two SCART inputs) input level: < 2 V rms, input impedance: > 25 k Ω
- one selectable analogue mono input (i.e. AM sound): Not used in this chassis
- two high-quality A/D converters, S/N-Ratio: > 85 dB
- 20 Hz to 20 kHz bandwidth for SCART-to-SCART copy facilities
- loudspeaker: one pair of four-fold oversampled D/A converters. Output level per channel: max. 1.4 Vrms output resistance: max. 5 k Ω . S/N-ratio: > 85 dB at maximum volume Max. noise voltage in mute mode: < 10 μ V (BW: 20 Hz... 16kHz)
- one pair of four-fold oversampled D/A converters supplying a pair of SCART-outputs. output level per channel: max. 2 Vrms, output resistance: max. 0.5 k Ω , S/N-Ratio: > 85 dB (20 Hz... 16 kHz)

4-2-1-4 NICAM plus FM/AM-Mono

According to the British, Scandinavian, Spanish, and French TV-standards, high-quality stereo sound is transmitted digitally. The systems allow two high-quality digital sound channels to be added to the already existing FM/AM-channel. The sound coding follows the format of the so-called Near Instantaneous Companding System (NICAM 728). Transmission is performed using Differential Quadrature Phase Shift Keying (DQPSK. Table below offers an overview of the modulation parameters.)

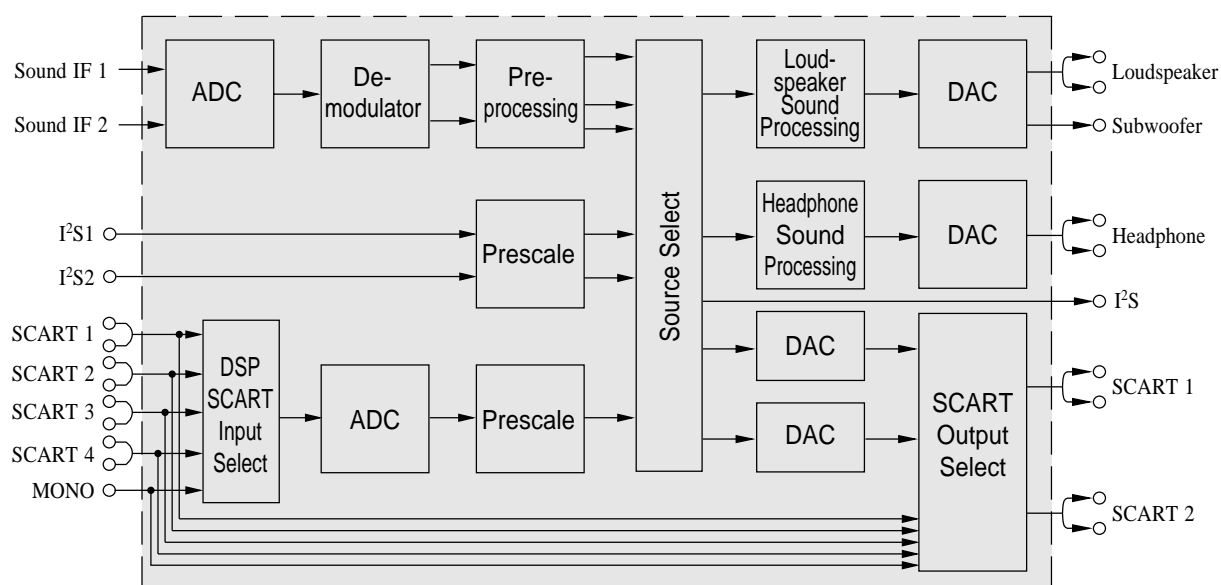
In the case of NICAM/FM (AM) mode, there are three different audio channels available: NICAM A, NICAM B, and FM/AM-mono. NICAM A and B may belong either to a stereo or to a dual language transmission. Information about operation mode and about the quality of the NICAM signal can be read by the controlling software via the control bus. In the case of low quality (high bit error rate), the controlling software may decide to switch to the analogue FM/AM-mono sound. Alternatively, an automatic NICAM-FM/AM switching may be applied.

4-2-1-5 German 2-Carrier System (DUAL FM System)

Since September 1981, stereo and dual sound programs have been transmitted in Germany using the 2-carrier system. Sound transmission consists of the already existing first sound carrier and a second sound carrier additionally containing an identification signal. More details of this standard are given in Tables below. For D/K very similar system is used.

TV standards

TV system	Position of sound carrier (MHz)	Sound modulation	Color system	Country
B/G	5.5 / 5.7421875	FM Stereo	PAL	Germany
B/G	5.5 / 5.85	FM-Mono / NICAM	PAL	Scandinavia, Spain
L	6.5 / 5.85	AM-Mono / NICAM	SECAM-L	France
I	6.0 / 6.552	FM-Mono / NICAM	PAL	UK
D/K	6.5 / 6.2578125 D/K1	FM Stereo	SECAM-East	USSR
	6.5 / 6.7421875 D/K2			
	6.5 / 5.85 D/K-NICAM	FM-Mono / NICAM		
				Hungary



Architecture of MSP341x

Pin connections and short description

Pin No.	Pin Name	Type	Short description
1	AUDIO CLOCK OUT		
2	NC		
3	NC		
4	VIDEO SW	OUT	VIDEO SWITCH
5	PLAY LED	OUT	PLAY LED SELECT
6	ADDRESS SEL	IN	IIC BUS ADDRESS
7	STAND BY	IN	STAND BY
8	NC		
9	SCL		
10	SDA		
11	IIC CLOCK	IN / OUT	IIC CLOCK
12	IIC SW		IIC SWITCH
13	IIC DATA OUT	OUT	IIC DATA OUT

PSDIP 64-pin	Pin Name	Type	Short Description
14	IIC DATA IN	IN	IIC DATA IN
15	ADDRESS DATA		
16	ADDRESS SWITCH		
17	ADDRESS CLOCK		
18	Vcc(5v)		
19	Vss		
20	IIC DIGITAL IN2	IN	
21	NC		
22	NC		
23	NC		
24	RESET	IN	
25	H-P R OUT	OUT	
26	H-P L OUT	OUT	
27	VREF2		
28	R OUT	OUT	AUDIO R OUT
29	L OUT	OUT	AUDIO L OUT
30	NC		
31	SUB W OUT	OUT	
32	NC		
33	SC2 R OUT	OUT	AV1 AUDIO R OUT
34	SC2 L OUT	OUT	AV1 AUDIO L OUT
35	VREF1		
36	SC1 R OUT	OUT	SCART AUDIO R OUT
37	SC1 L OUT	OUT	SCART AUDIO L OUT
38	VOL CAP A		
39	Avcc(8v)		
40	VOL CAP M		
41	AHVss		
42	AREF		
43	SC4 L IN	IN	
44	SC4 R IN	IN	
45	ASGND4		
46	SC3 L IN	IN	AV2 AUDIO L IN
47	SC3 R IN	IN	AV2 AUDIO R IN
48	ASGND2		
49	SC2 L IN	IN	DVD AUDIO L IN
50	SC2 R IN	IN	DVD AUDIO R IN
51	ASGND1		
52	SC1 L IN	IN	SCART AUDIO L IN
53	SC1 R IN	IN	SCART AUDIO R IN
54	VREFTOP		
55	MONO IN	IN	
56	Avss		
57	Avcc(5v)		
58	IF INPUT1	IN	IF AUDIO IN
59	IF COMMON		
60	IF INPUT2	IN	
61	TESTEN		
62	XTAL IN	IN	
63	XTAL OUT	OUT	
64	TP		

4-3 TDA9886 IIC-bus controlled single/multi standard Alignment-free IF-PLL

4-3-1- DISCRIPTION

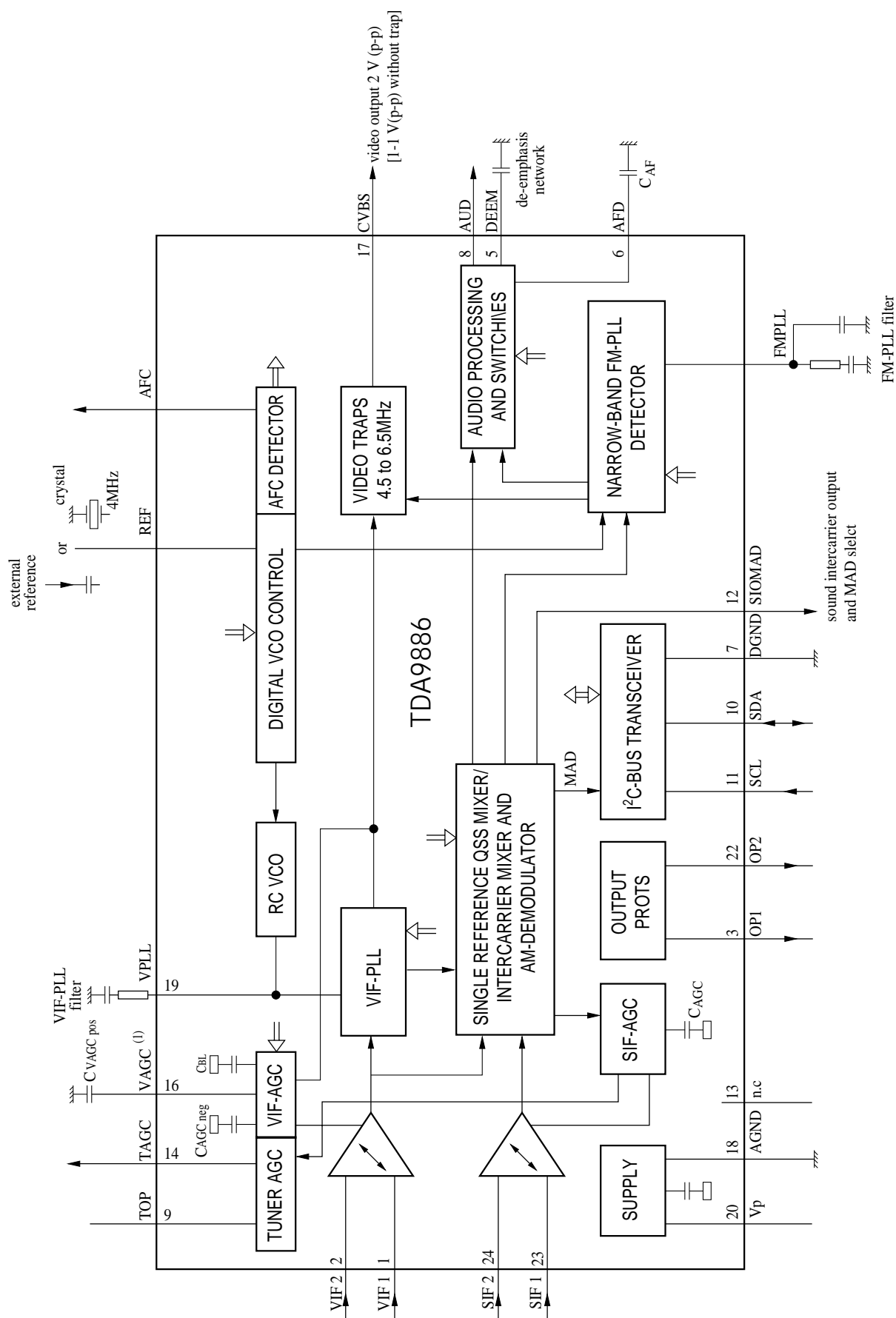
The TDA9885 is an alignment-free single standard(without positive modulation) vision and Sound IF signal PLL.
The TDA9886 is an alignment-free multistandard (PAL,SECAM and NTSC) vision and sound IF signal PLL demodulator for positive and negative modulation including sound AM and FM processing.

4-3-2- FEATURES

- 5V Supply voltage.
- Gain controlled wide-band Vision Intermediate Frequency (VIF) amplifier (AC-coupled).
- Multistandard true synchronous demodulation with active carrier regeneration (very linear demodulation, good intermodulation figures, reduced harmonics, excellent pulse response).
- Gated phase detector for L/L accent standard.
- Fully integrated VIF Voltage controlled Oscillator(VCO), alignment-free, frequencies switchable for all negative and positive modulated standards via I²C-bus.
- Digital acquisition help, VIF frequencies of 33.4, 33.9, 38.0, 38.9, 45.75 and 58.75 MHz.
- 4 MHz reference frequency input [signal from Phase-Locked Loop (PLL) tuning system] or operating as crystal oscillator.
- VIF Automatic Gain Control (AGC) detector for gain control, operating as peak sync detector for negative modulated signals and as a peak white detector for positive modulated signals.
- Precise fully digital Automatic Frequency control (AFC) detector with 4-bit digital-to-analog converter ; AFC bits via I²C-bus readable.
- TakeOver Point (TOP) adjustable via I²C-bus or alternatively with potentiometer.
- Fully integrated sound carrier trap for 4.5, 5.5, 6.0 and 6.5 MHz, controlled by FM-PLL oscillator.
- Sound IF (SIF) input for single reference Quasi Split Sound(QSS) mode (PLL controlled).
- SIF AGC for gain controlled SIF amplifier ; single reference QSS mixer able to operate in high Performance single reference QSS mode and in intercarrier mode, switchable via I²C-bus.
- AM demodulator without extra reference circuit.
- alignment-free selective FM-PLL demodulator with high linearity and low noise.
- I²C-bus control for all functions.
- I²C-bus transceiver with pin programmable Module Address (MAD).

4-3-3 PINNING

SYMBOL	PIN	DESCRIPTION	SYMBOL	PIN	DESCRIPTION
VIF1	1	VIF differential input 1	n.c	13	not connected
VIF2	2	VIF differential input 2	TAGC	14	tuner AGC output
OP1	3	DVD Reset (open-collector)	REF	15	4MHz crystal or reference input
FMPLL	4	FM-PLL for loop filter	VAGC	16	VIF-AGC for capacitor : note 1
DEEM	5	de-emphasis output for capacitor	CVBS	17	Video output
AFD	6	AF decoupling input for capacitor	AGND	18	analog ground
DGND	7	digital ground	VPLL	19	VIF-PLL for loop filter
AUD	8	Audio output	Vp	20	supply voltage (+5V)
TOP	9	Tuner AGC TakeOver point(TOP)	AFC	21	AFC output
SDA	10	I ² C-bus data input/output	OP2	22	output 2(open-collector)
SCL	11	I ² C-bus clock input	SIF1	23	SIF differential input 1
SLOMAD	12	sound intercarrier output and MAD select	SIF2	24	SIF differential input 2



4-4 TDA894xJ Stereo Audio Amplifier

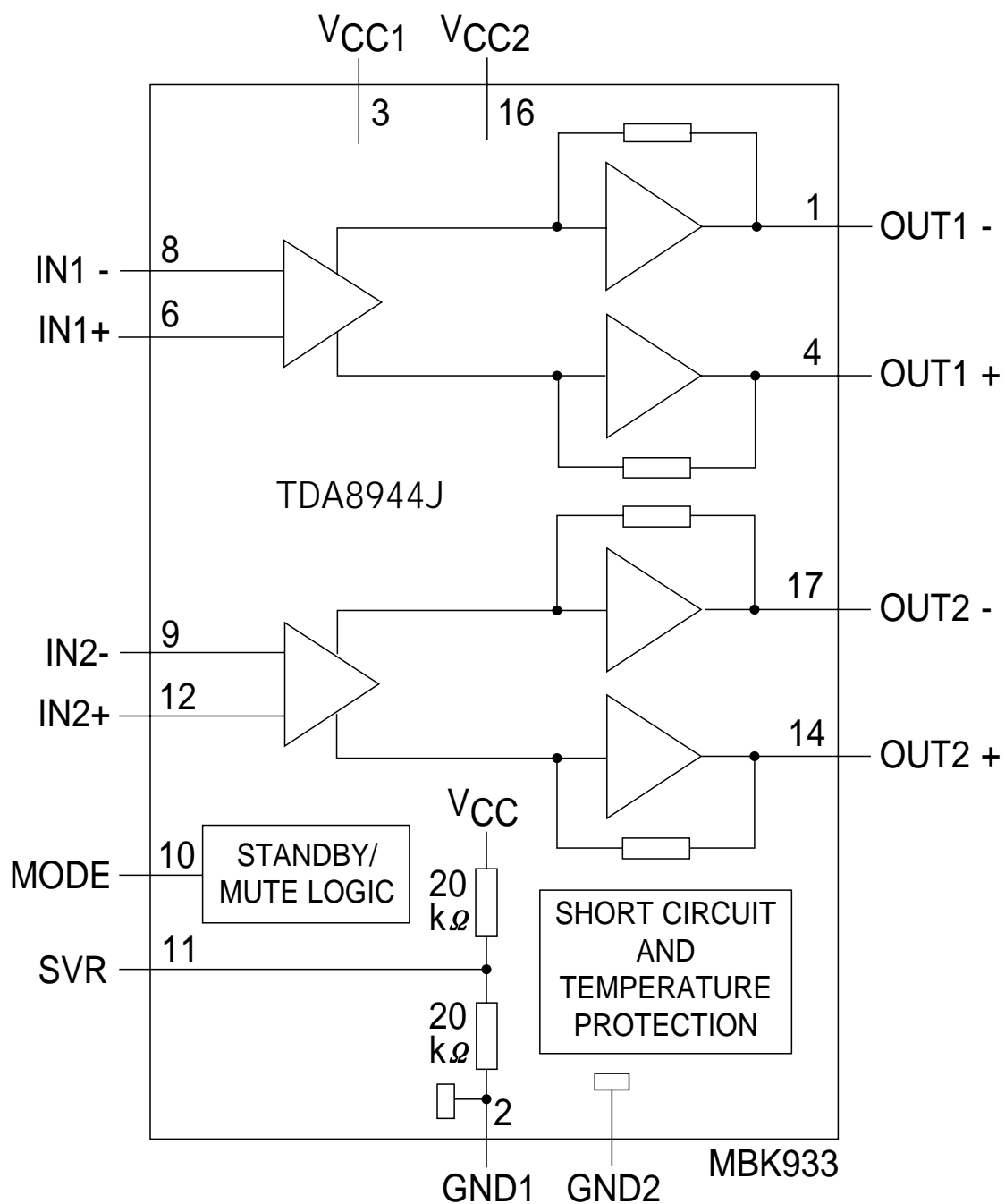
The TDA8944J is a dual-channel audio power amplifier with an output power of 2 x 5W at an 8 Ω load and a 12V supply. The circuit contains two Bridges Tied Load(BTL) amplifiers with an all-NPN output stage and standby/mute logic. The TDA8944J comes in a 17-pin DIL power package.

4-4-1- Features

- Few external components
- Fixed gain
- Standby and mute mode
- No on/off switching pop noise
- low standby current
- High supply voltage ripple rejection
- Outputs short-circuit protected to ground, supply and across the load
- Thermally protected

Pin description

Pin	Symbol	Description
1	OUT1-	negative loudspeaker terminal 1
2	GND1	ground channel 1
3	Vcc1	supply voltage channel 1
4	OUT1+	positive loudspeaker terminal 1
5	n.c.	not connected
6	IN1+	positive input 1
7	n.c.	not connected
8	IN1-	negative input1
9	IN2-	negative input2
10	MODE	mode selection input
11	SVR	half supply voltage decoupling (ripple rejection)
12	IN2+	positive input2



Block diagram TDA8944J

4-5 TDA835xJ Vertical Amplifier

The TDA835xJ are power circuit for use in 90° and 110° colour deflection systems for field frequencies of 25 to 200Hz and 16/9 picture tubes. The circuit provides a DC driven vertical deflection output circuit, operating as a highly efficient class G system. Due to the full bridge output circuit the deflection coils can be DC coupled.

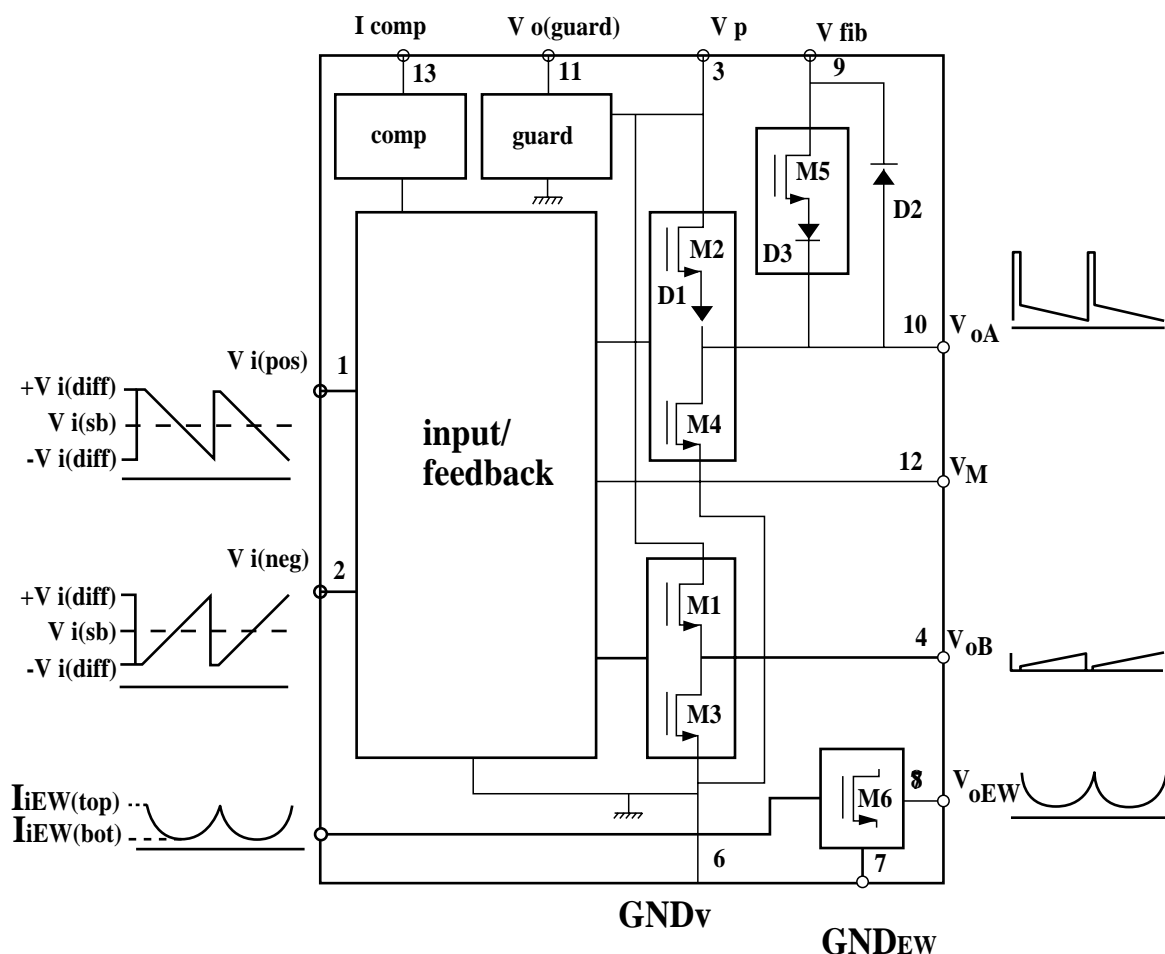
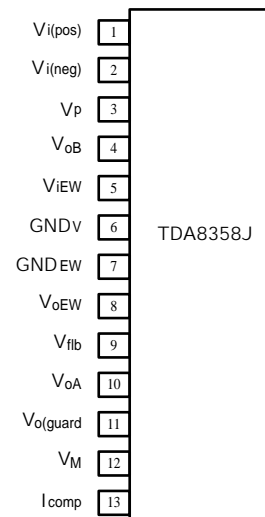
The IC is constructed in a Low Voltage DMOS process that combines Bipolar, CMOS and DMOS devices. MOS transistors are used in the output stage because of the absence of second breakdown.

4-5-1 TDA8358J

An East-West output stage is provided that is able to sink current from the diode modulator circuit.

Features :

- Few external components
- Highly efficient fully DC-coupled vertical output bridge circuit
- Short rise and fall time of the vertical flyback switch
- Guard circuit
- Temperature (thermal) protection
- High EMC because of common mode inputs
- East-West output stage



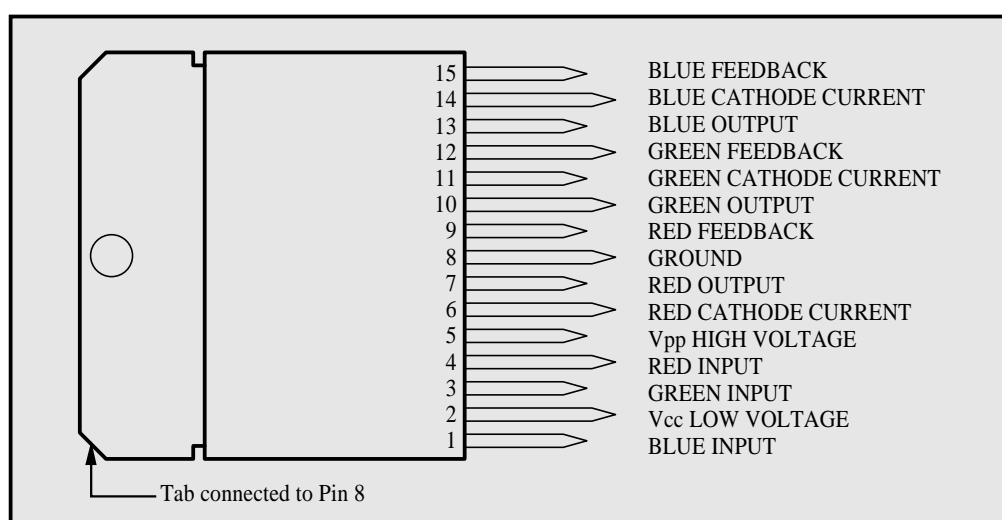
4-6 TEA5101B

The TEA5101B includes three video amplifiers designed with a high voltage DMOS/bipolar technology. It drives directly the three CRT cathodes. The device is protected against flashovers. Due to its three cathode current output, the TEA5101B can be used with both parallel and sequential sampling applications.

Features

- BANDWIDTH : 10MHz TYPICAL
- RISE AND FALL TIME : 50ns TYPICAL
- CRT CATHODES CURRENT OUTPUTS FOR PARALLEL OR SEQUENTIAL CUT-OFF OR DRIVE ADJUSTMENT
- FLASHOVER PROTECTION
- POWER DISSIPATION : 3.5W
- ESD PROTECTED

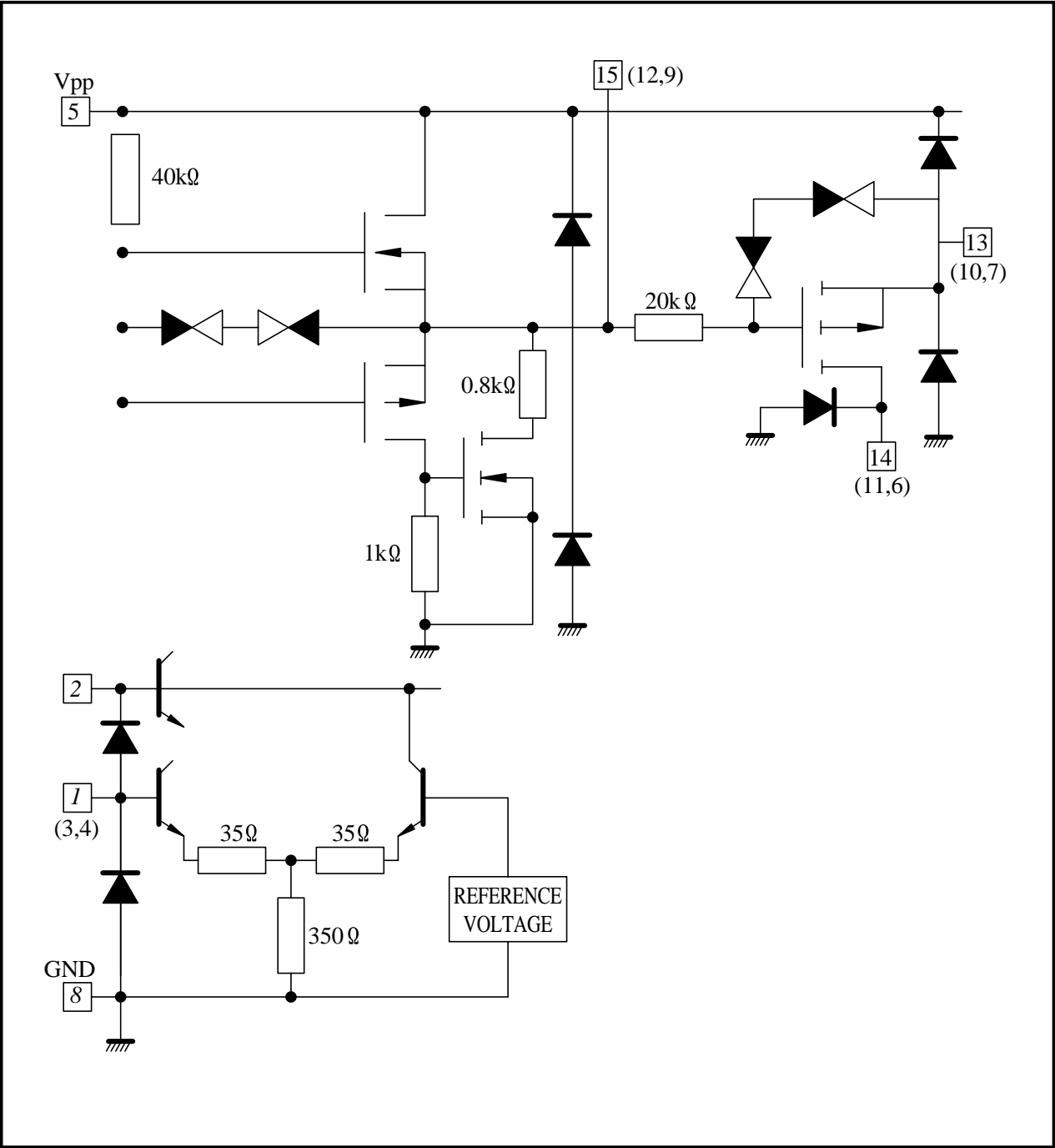
PIN CONNECTIONS



PIN FUNCTION

No	Function	Description
1	Blue Input	Input of the "blue" amplifier. It is a virtual ground with 3.8V bias voltage 15 microamperes input bias current with 14kΩ input resistance.
2	Vcc	Low voltage power supply. typically 12V.
3	Green Input	See Pin 1.
4	Red Input	See Pin 1.
5	Vpp	High voltage Power supply, typically 200V.
6	Red Cathode Current	Provides the video processor with a copy of the DC current flowing into the red cathode, for automatic cut-off or gain adjustment, If this control is not used, Pin 6 must be grounded.
7	Red Output	Output driving the red cathode. Pin 7 is internally protected against CRT arc discharges by a diode limiting the output voltage to Vpp.
8	Ground	Also connected to the heatsink.
9	Red Feedback	Output driving the feedback resistor network for the red amplifier.
10	Green Output	See Pin 7.
11	Green Cathode Current	See Pin 6.
12	Green Feedback	See Pin 9.
13	Blue Output	See Pin 7.
14	Blue Cathode Current	See Pin 6.
15	Blue Feedback	See Pin 9.

BLOCK DIAGRAM OF EACH CHANNEL



4-7 24C16 - 16 Kb EEPROM

***CAUTION**

When you change this EEPROM IC, give attention blow.

You must wait displaying "MENU" on the screen after changed it.

And then you operate searching operation please.

features :

- 16 Kbit serial I2C bus EEPROM
- Single supply voltage : 4.5 V to 5.5 V
- 1 Million Erase/Write cycles (minimum)
- 40 year data retention (minimum)

Pin description

Pin No.	Name	Description
1, 2, 3	E0, E1, E2	Device address - not used
5	SDA	Serial Data/Address Input/Output
6	SCL	Serial clock
7	GND	GROUND
8	Vcc	GROUND
4	Vss	GROUND

The memory device is compatible with the I2C memory standard. This is a two wire serial interface that uses a bi-directionnal data bus and serial clock. The memory carries a built-in 4-bit unique device type identifier code (1010) in accordance with the I2C bus definition.

Serial Clock (SCL)

The SCL input is used to strobe all data in and out of the memory.

Serial Data (SDA)

The SDA pin is bi-directionnal, and is used to transfer data in or out of the memory

4-8 STR - F6654

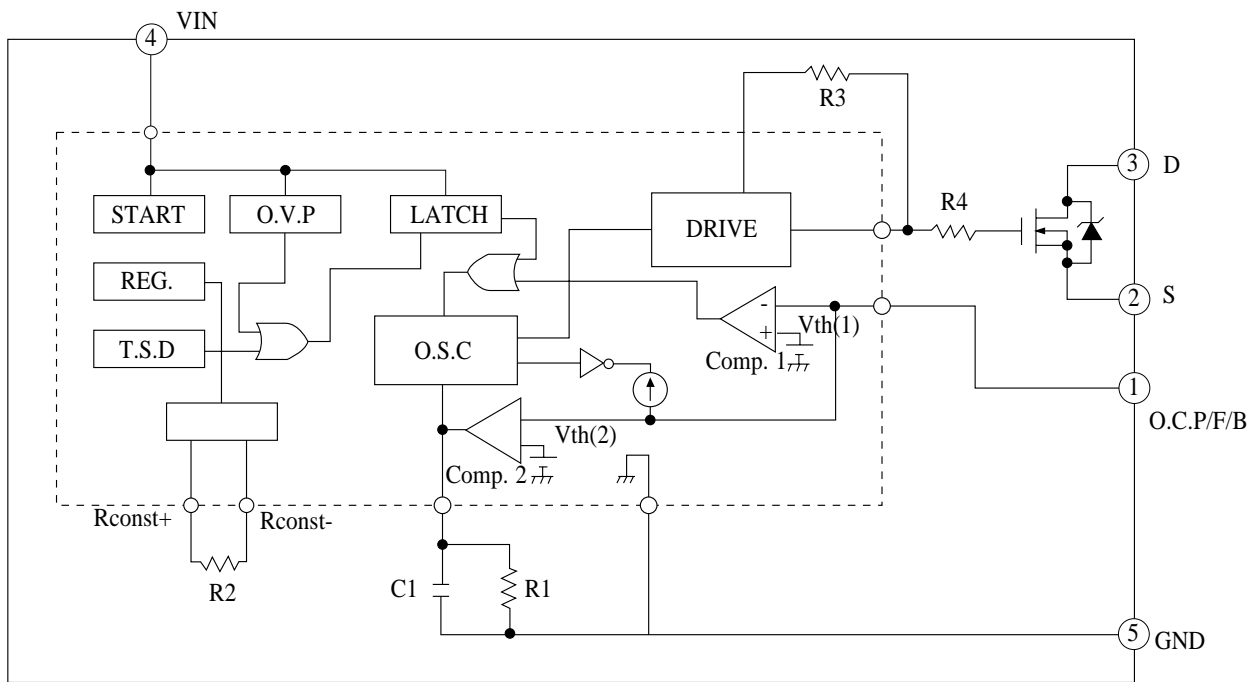
4-8-1 General description

The STR-F6654 is an hybrid IC with a build-in MOSFET and control IC, designed for flyback converter type switch mode power supply applications.

4-8-2 Features

- Small SIP fully isolated molded 5 pins package
- Many protection functions :
 - * Pulse-by-pulse overcurrent protection (OCP)
 - * Over voltage protection with latch mode (OVP)
 - * Thermal protection with latch mode (TSD)

4-8-3 Block diagram



4-8-4 Pins description

pin	name	symbol	description
1	Overcurrent / feedback	O.C.P./ F.B.	Input of over current detection signal and feedback signal
2	Source	S	MOSFET source
3	Drain	D	MOSFET drain
4	Supply	V_{IN}	Input of power supply for control circuit
5	Ground	GND	Ground

4-8-5 Control part electrical characteristics

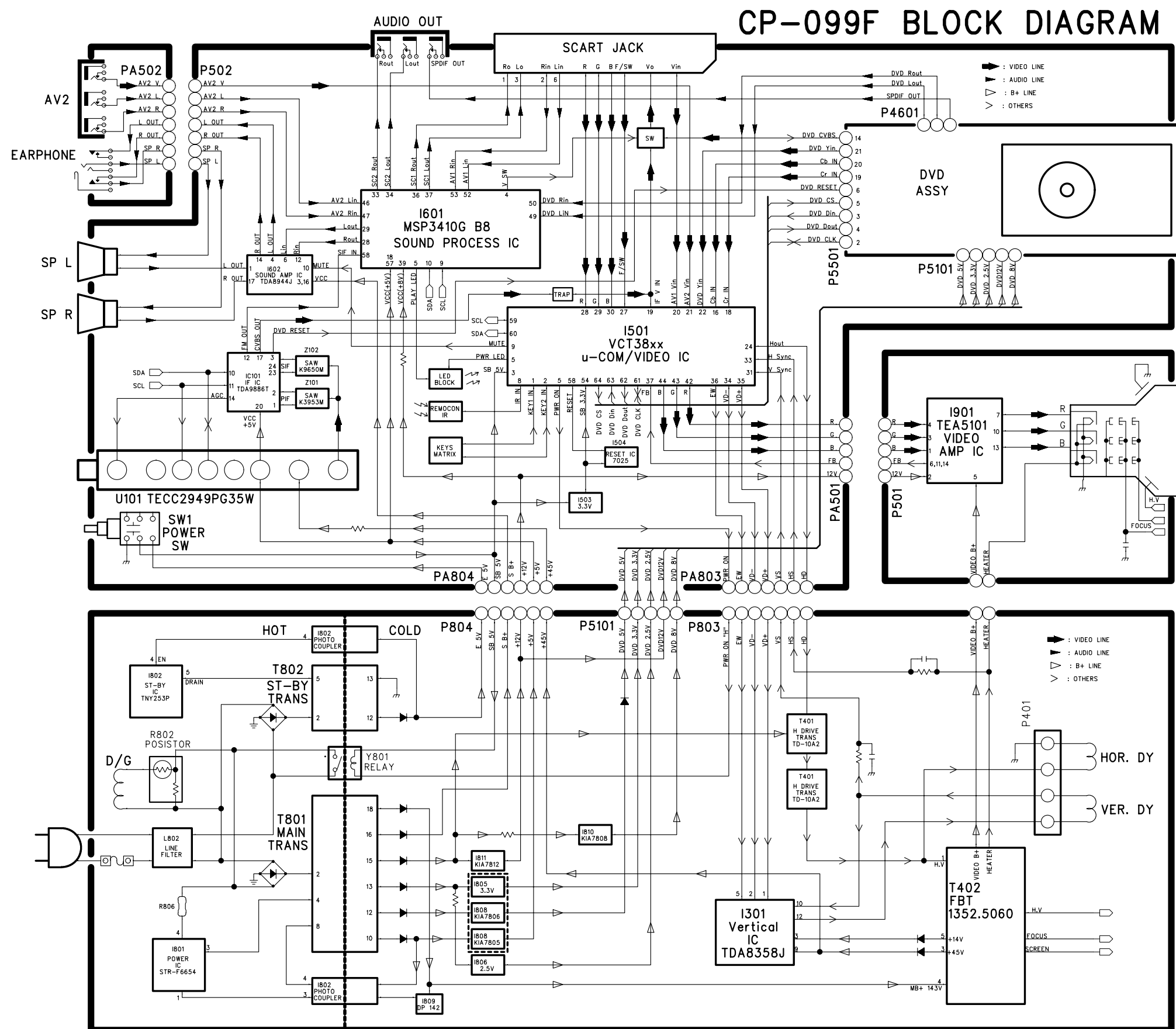
DESCRIPTION	IC PIN NUMBER	SYMBOL	RATING			UNIT
			MIN.	TYPE	MAX	
Operation start voltage	4-5	V_{IN} (on)	14.4	16	17.6	V
Operation stop voltage	4-5	V_{IN} (off)	9	10	11	V
Circuit current in operation	4-5	I_{IN} (on)	-	-	30	mA
Circuit current in non-operation	4-5	I_{IN} (off)	-	-	100	μA
Maximum OFF time	-	T_{OFF} (max)	45	-	55	μsec
Minimum time for input of quaxi resonant signals	1-5	T_{TH} (2)	-	-	1.0	μsec
Minimum off time	-	T_{OFF} (min)	-	-	1.5	μsec
O.C.P./F.B. terminal threshold voltage 1	1-5	V_{TH} (1)	0.68	0.73	0.78	V
O.C.P./F.B. terminal threshold voltage 2	1-5	V_{TH} (2)	1.3	1.45	1.6	V
O.C.P./F.B. terminal extraction current	1-2	$I_{OCP/FB}$	1.2	1.35	1.5	mA
O.V.P. operation voltage	4-5	V_{IN} (OVP)	20.5	22.5	24.5	V
Latch Current sustaining voltage	4-5	I_{IN} (H)	-	-	400	μA
Latch Current release voltage	4-5	V_{IN} (La.off)	6.6	-	8.4	V
Thermal shutdown operating temperature	-	T_J (TSD)	140	-	-	$^{\circ}C$

4-8-6 MOSFET electrical characteristics

DESCRIPTION	IC PINS NUMBER	SYMBOL	RATING			UNIT
			MIN.	TYPE	MAX	
Drain-to-source breakdown voltage	3-2	V_{DSS}	650	-	-	V
Drain leakage current	3-2	I_{DSS}	-	-	300	μA
On-resistance	3-2	R_{DS} (on)	-	-	1.15	Ω
Switching time	3-2	t_f	-	-	250	nsec
Thermal resistance	-	O_{CH-F}	-	-	0.95	$^{\circ}C/W$

5- Circuit desription

5-1 Block diagram



5-2 IF section

5-2-1 Picture IF Amplifier

The Picture IF signal (PIF) is fed through a SAW filter to the differential input (Pin 1-2) of the PIF amplifier. This amplifier consists of three AC-coupled amplifier stages. Each differential amplifier is gain controlled by the automatic gain control circuit (PIF-AGC). The output signal of the PIF amplifier is applied to the FPLL carrier generation and the video demodulator.

5-2-2 Tuner and VIF-AGC

This block adapts the voltage, generated at the VIF/SIF-AGC detector, to the internal signal processing at VIF/SIF amplifier and performs the tuner AGC control current generation. The onset of tuner AGC control current generation can be set either by I²C-bus (see Table 23) or optional (in case that I²C-bus information cannot be stored) by a potentiometer at pin 9. The presence of a potentiometer will automatically be detected and disables the I²C-bus setting.

Furthermore, derived from the AGC detector voltage, a comparator is used to test the corresponding VIF input level to be smaller than 200 μ V. This information can be read out ('VIF HIGH LEVEL') via I²C-bus.

5-2-3 VIF-AGC detector

Gain control performed by sync-level detection (negative modulation) or peak White detection (positive modulation).

For negative modulation the sync level voltage is stored at an integrated capacitor by means of a fast peak detector. This voltage is compared with a reference voltage (nominal sync level) by a comparator which charges/discharges the (integrated) AGC capacitor for generation of the required VIF gain. The time constants for decreasing/increasing gain are nearly equal and the total AGC reaction time is fast to cope with 'aeroplane fluttering'.

For positive modulation the white peak level voltage is compared with a reference voltage (nominal white level) by a comparator which charges (fast) or discharges (slow) the (external) AGC capacitor directly for generation of the required VIF gain. This very large time constant for VIF gain increase is needed caused by the fact the peak white level may appear only once in a field. In order to reduce this time constant, an additional level detector increases the discharging current of the AGC capacitor (fast mode) in the event of a decreasing VIF amplitude step controlled by the detected actual black level voltage. The threshold level for fast mode AGC is typical -6 dB video amplitude.

The fast mode state also is transferred to the SIF AGC detector for speed-up. In case of missing peak white pulses the VIF gain increase is limited to typical +3 dB by comparing the detected actual black level voltage with a corresponding reference voltage.

5-2-4 Frequency Phase-Locked Loop(FPLL) detector

The VIF amplifier output signal is fed into a frequency detector and into a phase detector via a limiting amplifier for removing the video AM. During acquisition the frequency detector produces a current proportional to the frequency difference between the VIF and the VCO signal.

After frequency lock-in the phase detector produces a current proportional to the phase difference between the VIF and the VCO signal. The currents from the frequency and phase detector are charged into the loop filter which control the VIF VCO and locks it to the frequency and phase of the VIF carrier. For positive modulated VIF signal the charging currents are gated by composite sync in order to avoid signal distortion in case of overmodulation.

The gating depth is switchable via I²C-bus.

5-2-5 VCO and divider

The VCO of the VIF-FPLL operates as integrated low radiation oscillator at double the picture carrier frequency. The control voltage required to tune the VCO to actually double the picture carrier frequency is generated at the loop filter by the frequency Phase detector. The typical possible frequency range is about 50 to 140MHz.

The oscillator frequency is divided-by-two for providing two differential square wave signals with exactly 90 degrees phase difference, independent of the frequency, for use in the FPLL detectors, the video demodulator in the intercarrier mixer.

5-2-6 Digital acquisition help and AFC

Each relaxation oscillator of the VIF-PLL and FM-PLL demodulator has a wide frequency range. To prevent false locking of the PLL's and with respect to the catching range, the digital acquisition help provides an individual control until the VCO's frequency is within the preselected standard and the PLL dependent lock-in window.

The in/out window control at FM-PLL is additionally be used to mete the audio stage (if auto mute is selected via I²C-bus control). The principle working of the digital acquisition help is as follows : The PLL VCO output is connected to a down counter, which start value is standard dependent predefined. The VCO frequency clocks the down counter for a fixed gate time. Thereafter the down counter stop value is analysed. In case the stop value is higher (lower) than the expected value range, the VCO frequency is lower (higher) than the wanted lock-in window frequency range. A positive (negative) control current is injected into the PLL loop filter and consequently the VCO frequency will be increased (decreased) and a new counting cycle starts.

The gate time as well as the control logic of the acquisition help circuit is dependent on the precision of the reference signal at pin 15. Operation as crystal oscillator is possible as well as connecting this input via a serial capacitor to another reference frequency source e.g. the tuning system oscillator.

The AFC signal is derived from the corresponding down counter stop value after a counting cycle. The last four bits are latched and can be read out via I²C-bus (see Table 7). also the digital-to-analog converted value is given as current at pin 21.

5-2-7 Video demodulator and amplifier

The video demodulator is realized by a multiplier which is designed for low distortion and large bandwidth. The vision IF signal is multiplied with the 'in phase' signal or the VIF-PLL VCO.

The demodulator output signal is fed into the video preamplifier via a level shift stage with integrated low-pass filter to achieve carrier harmonic attenuation.

The preamplifiers output signal is fed to the VIF-AGC detector (see Section "VIF-AGC detector") and in case of sound trap mode internally to the integrated sound carrier trap(see Section "Sound carrier trap".) The differential trap output signal is converted and amplified by the following post-amplifier. The video output level at pin 17 is 2 V(p-p).

In case of bypass mode the preamplifiers output signal is fed direct through the post-amplifier to pin 17. The output video level is 1.1 V(p-p) for using an external sound trap with 10% loss over all. Noise clipping is provided in both cases.

5-2-8 Sound carrier trap

The sound carrier trap consists of a reference filter, a phase detector and the sound trap itself. A sound carrier reference signal is fed into the reference low-pass filter and is shifted by nominal 90 degrees.

The phase detector compares the original reference signal with the signal shifted by the reference filter and proudces a DC voltage by charging/discharging the capacitor with a current proportional to the phase difference between both signals, respectively to the frequency error of the integrated filters. The DC voltage controls the frequency position of the reference filter and the sound trap. So the accurate frequency position or the different standard is set by the sound carrier reference signal.

The sound trap itself is constructed of three separate traps to realize sufficient suppression of the first and second sound carrier.

5-2-9 SIF amplifier

The SIF amplifier consists of three AC-coupled differential stages. Gain control is performed by emitter degeneration, Total gain control range is 66dB typical. The differential input impedance is typical 2k Ω in parallel with 3 pF.

5-2-10 AGC detector

SIF gain control is performed by detection of the DC component of the AM demodulator output signal. This DC signal is directly corresponding to the SIF voltage at the output of the SIF amplifier so that a constant SIF signal is supplied to the AM demodulator and the single reference QSS mixer.

By switching the gain of the input amplifier of the SIF AGC detector Via I²C-bus the internal SIF level for FM sound is 5.5 dB lower than for AM sound. This is done to adapt the SIF-AGC characteristic. The adaption is optimal for picture-to-sound carrier ratio of 13 dB. Via a comparator the integrated AGC capacitor is charged/discharged for generation of the required SIF gain. Due to AM sound the AGC reaction time is slow ($f_c < 20$ Hz for the closed AGC loop.) For reducing this AM sound time constant in the event of a decreasing IF amplitude step, the charging/discharging current of the AGC capacitor is increased (fast mode), when the VIF-AGC detector (at positive modulation mode) operates in fast mode, too. An additional circuit (threshold about +7 dB) ensures a very fast gain reduction for a large increasing IF amplitude step.

5-2-11 Single reference QSS mixer

With the present system a high performance Hi-Fi stereo sound processing can be achieved. For a simplified application without a Sound IF SAW filter the single reference QSS mixer can be switched to the intercarrier mode by I²C-bus. This single reference QSS mixer generates the 2nd FM TV sound intercarrier signal. It is realized by a linear multiplier Which multiplies the SIF amplifier output signal and the VIF VCO signal (90 degrees output), which is locked to the picture carrier. By this way the QSS mixer operates as quadrature mixer in case of intercarrier mode and provides suppression of the low frequency video signals.

The QSS mixer output signal is fed via a high/low-pass combination internally to the FM demodulator as well as via an operational amplifier to the intercarrier output pin 12.

5-2-12 AM demodulator

The amplitude modulated SIF amplifier output signal is fed both to a two-stage limiting amplifier for removing the AM and to a linear multiplier. The result of multiplication of the SIF signal with the limiter output signal is AM demodulation (passive synchronous demodulator). The demodulator output signal is fed via a low-pass filter for attenuation of the carrier harmonics and via the input amplifier of the SIF-AGC detector to the audio amplifier.

5-2-13 FM demodulator and acquisition help

Gain controlled FM amplifier and detector

The intercarrier signal from the intercarrier mixer is fed to the input of an AC coupled gain controlled amplifier with two stages. The gain controlled output signal is fed to the phase detector of the narrow-band FM-PLL (FM demodulator). For good selectivity and robustness against disturbance caused by the video signal, high linearity of the gain controlled FM amplifier and of the phase detector as well as constant signal level are required. Gain control is done by means of an 'in phase' demodulator for the FM carrier (from the output of the FM amplifier). The demodulation output is fed into a comparator for charging/discharging the integrated AGC capacitor. This leads to a mean value AGC loop to control the gain of FM amplifier.

Narrow-band PLL

The FM demodulator is realized as a narrow-band PLL with external loop filter, which provides the necessary selectivity (bandwidth about 100 kHz). To achieve good selectivity, a linear phase detector and constant input level are required. The gain controlled intercarrier signal from the FM amplifier is fed to the phase Detector (PD). The PD controls via the loop filter the integrated low radiation relaxation oscillator. The designed frequency range is from 4 to 7 MHz.

The VCO within the FM-PLL is phase-locked with the incoming 2nd SIF. This 2nd SIF is frequency modulated (FM). On to this fact, the VCO control voltage is superimposed by the AF voltage. Therefore the VCO tracks with the FM of the 2nd SIF. So the AF voltage is present at the loop filter (about 5 mV RMS for 27 kHz FM deviation). This AF signal is fed via a buffer to the audio amplifier.

The correct locking of the PLL is supported by the digital acquisition help circuit (see Section "Digital acquisition help and AFC").

5-2-14 Audio amplifier and mute time constant

The audio amplifier and mute time constant

1. The AF preamplifier used for FM sound is an operational amplifier with internal feedback, high gain and high common mode rejection. The AF voltage from the PLL demodulator (5 mV RMS for frequency deviation of 27 kHz) is amplified by 30 dB. By use of a DC operating point control circuit (with external capacitor CAF), the AF preamplifier is decoupled from the PLL DC voltage. The low-pass characteristic of the amplifier reduces the harmonics of the sound intercarrier signal at the AF output terminal. For FM sound a switchable de-emphasis network (with external capacitor) is implemented between the preamplifier and the output amplifier.
2. The AF output amplifier provides the required AF output level by a rail-to-rail output stage. A preceding stage makes use of an input selector for switching between FM sound, AM sound and mute state. The gain can be switched between 10 dB (normal) and 4 dB (reduced).
Switching to mute state is controlled automatically dependent on the digital acquisition help for the case the VCO of the FM-PLL is not in the required frequency window. This is done by a time constant (fast for switching to mute state and slow (about 40 ms) for switching to no-mute state)).

All switching functions are controlled via the I²C-bus :

AM sound, FM sound, forced mute

Auto mute enable, auto mute disable

De-emphasis off, de-emphasis on, 50 μ s , 75 μ s

Audio gain normal, audio gain reduced.

5-2-15 I²C-bus transceivers and MAD (module address)

The TDA9886 is controlled via the 2-wire I²C-bus by a microprocessor. Two wires serial data (SDA) and serial clock (SCL) carry information between the devices connected to the bus. The TDA9886 has an I²C-bus slave transceiver with auto-increment.

To avoid conflicts in a real application with other IC's providing similar or complementing functions, there are two possible slave addresses available which can be selected by pin 12. A slave address is sent from the master to the slave receiver. The slave address or the ICs given in Table 1. The circuit operates up to clock frequencies of 400 kHz.

Table 1 Slave address

A6	A5	A4	A3	A2	A1	A0	R/W
1	0	0	0	0	1	A0	1/0

The bit A0 is controlled via pin 12. When this pin is connected via a resistor (2.2 k Ω) to ground, second MAD (A0 = 0) is selected. If not, first MAD (A0 = 1) is active.

The power-on preset is also dependent on the pin 12 application and can be chosen for NTSC (45.75 MHz) as default or NTSC (58.75 MHz). By this way the device can be used as NTSC only device without I²C-bus.

5-2-16 Internal voltage stabilizer

The bandgap circuit internally generates a voltage of approximately 2.4 V, independent of supply voltage and temperature.

A voltage regulator circuit, connected to this voltage, produces a constant voltage of 3.55 V which is used as an internal reference voltage.

5-3 Video - VCT description

5-3-1 Introduction

The VCT 38xxA includes complete video, display, and deflection processing.

All processing is done digitally, the video front-end and video back-end are interfacing to the analogue world.

Most functions can be controlled by software via I²C bus slave interface.

5-3-2 Video Front-end

This block provides the analogue interfaces to all video inputs and mainly carries out analogue-to-digital conversion for the following digital video processing. Most of the functional blocks in the front-end are digitally controlled (clamping, AGC, and clock-DCO). The control loops are closed by the Fast Processor ('FP') embedded in the video decoder.

5-3-3 Input Selector

Up to seven analogue inputs can be connected. Four inputs are for input of composite video or S-VHS luma signal.

These inputs are clamped to the sync back porch and are amplified by a variable gain amplifier. Two chroma inputs can be used for connection of S-VHS carrier-chrominance signal. These inputs are internally biased and have a fixed gain amplifier.

5-3-4 Clamping

The composite video input signals are AC-coupled to the IC. The clamping voltage is stored on the coupling capacitors and is generated by digitally controlled current sources. The clamping level is the back porch of the video signal.

S-VHS chrominance is also AC-coupled. The input pin is internally biased to the center of the ADC input range. Each channel is sampled at 10.125 MHz with a resolution of 8 bit.

5-3-5 Automatic Gain Control

A digitally working automatic gain control adjusts the magnitude of the selected baseband.

5-3-6 Digitally Controlled Clock Oscillator

The clock generation is also a part of the analogue front-end. The crystal oscillator is controlled digitally by the control processor. The clock frequency can be adjusted within ± 150 ppm. This adjustment is done in factory for every TV set.

5-3-7 Analogue Video Output

The input signal of the Luma ADC is available at the analogue video output pin (#11). The signal at this pin is buffered by a source follower. The output voltage is 2 V. The magnitude is adjusted with an AGC in 8 steps together with the main AGC.

5-3-8 Adaptive Comb Filter (VCT3834A only)

The adaptive comb filter is used for high-quality luminance/chrominance separation for PAL or NTSC signals. The comb filter improves the luminance resolution (bandwidth) and reduces interferences like cross-luminance and cross-color artefacts. The adaptive algorithm can eliminate most of the mentioned errors without introducing new artefacts or noise. The filter uses two line delays to process the information of three adjacent video lines. To have a fixed phase relationship of the colour subcarrier in the three channels, the system clock (20.25 MHz) is fractionally locked to the colour subcarrier. This allows the processing of all colour standards and substandards using a single crystal frequency. The CVBS signal in the three channels is filtered at the subcarrier frequency by a set of bandpass/notch filters. The output of the three channels is used by the adaptation logic to select the weighting that is used to reconstruct the luminance/chrominance signal from the 4 bandpass/notch filter signals. By using soft mixing of the 4 signals switching artefacts of the adaption algorithm are completely suppressed. The comb filter uses the middle line as reference, therefore, the comb filter delay is one line. If the comb filter is switched off, the delay lines are used to pass the luma/ chroma signals from the A/D converters to the luma/ chroma outputs. Thus, the comb filter delay is always one line.

5-3-9 Color Decoder

In this block, the standard luma/chroma separation and multi-standard colour demodulation is carried out. The colour demodulation uses an asynchronous clock, thus allowing a unified architecture for all colour standards.

The colour killer uses the burst-phase/ burst-frequency measurement to identify a PAL/NTSC or SECAM colour signal. For PAL/NTSC, the colour is switched off (killed) as long as the colour subcarrier PLL is not locked. For SECAM, the killer is controlled by the toggle of the burst frequency. The burst amplitude measurement is used to switch-off the colour if the burst amplitude is below a programmable threshold. Thus, colour will be killed for very noisy signals. The colour amplitude killer has a programmable hysteresis.

The burst-frequency measurement is also used for automatic standard recognition (together with the status of horizontal and vertical locking) thus allowing a completely independent search of the line and colour standard of the input signal. The following standards can be distinguished:

PAL B,G,H,I; NTSC M; SECAM; NTSC 44; PAL M; PAL N; PAL 60. In AV mode or when Prg No 0 is selected all the standards above are enabled by the controlling software. In INSTALL menu the controlling software enables PAL B,G, H,I and SECAM detection. The colour standard for each program number is stored in EEPROM. Outside INSTALL menu and for programmes numbers 1 to 99, the auto colour detection is disabled, the colour standard is recall from EEPROM and forced.

5-3-10 Horizontal Scaler (VCT3834A only)

The 4:2:2 Y,C r ,C b signal from the colour decoder is processed by the horizontal scaler. The scaler block allows a linear or nonlinear horizontal scaling of the input video signal in the range of 0.25 to 4. Nonlinear scaling, also called "Panoramavision", provides a geometrical distortion of the input picture. It is used to fit a picture with 4:3 format on a 16:9 screen by stretching the picture geometry at the borders. Also, the inverse effect can be produced by the scaler. The scaler contains a programmable decimation filter, a 1-line FIFO memory, and a programmable interpolation filter.

5-3-11 Video Sync Processing

To extract the sync information from the video signal, a linear phase low-pass filter eliminates all noise and video contents above 1 MHz. The sync is separated by a slicer; the sync phase is measured. A variable window can be selected to improve the noise immunity of the slicer. The phase comparator measures the falling edge of sync, as well as the integrated sync pulse. The sync phase error is filtered by a phase-locked loop that is computed by the Fast Processor. All timing in the front-end is derived from a counter that is part of this PLL, and it thus counts synchronously to the video signal. A separate hardware block measures the signal back porch and also allows gathering the maximum/minimum of the video signal. This information is processed by the FP and used for gain control and clamping. For vertical sync separation, the sliced video signal is integrated. The FP uses the integrator value to derive vertical sync and field information. The information extracted by the video sync processing is multiplexed onto the hardware front sync signal (FSY) and is distributed to the rest of the video processing system.

The data for the vertical deflection, the sawtooth, and the East-West correction signal is calculated by the VCT 38xxA.

5-3-12 Display Processing

In the display processing the conversion from digital YC r C b to analogue RGB is carried out.

In the luminance processing path, contrast and brightness adjustments and a variety of features, such as black-level expansion, dynamic peaking and soft limiting, are provided. In the chrominance path, the C r C b signals are converted to 4:4:4 format and filtered by a colour transient improvement circuit. The YC r C b signals are converted by a programmable matrix to RGB colour space. The digital OSD insertion circuit allows the insertion of a 5-bit OSD signal.

The OSD signals and the display clock are synchronised to the horizontal flyback.

5-3-13 Chroma Transient Improvement

The intention of this block is to enhance the chroma resolution. A correction signal is calculated by differentiation of the colour difference signals. The differentiation can be selected according to the signal bandwidth, e.g. for PAL/NTSC/SECAM or digital component signals, respectively. The amplitude of the correction signal is adjustable. Small noise amplitudes in the correction signal are suppressed by an adjustable coring circuit. To eliminate 'wrong colours' which are caused by over and undershoots at the chroma transition, the sharpened chroma signals are limited to a proper value automatically.

5-3-14 Video Back-end

The digital RGB signals are converted to analogue RGBs using three video digital-to-analogue converters (DAC) with 10-bit resolution. An analogue brightness value is provided by three additional DACs. The adjustment range is 40 % of the full RGB range. Controlling the white-drive/analogue brightness and also the external contrast and brightness adjustments is done via the Fast Processor, located in the front-end. Control of the cutoff DACs is done via I 2 C bus registers. Finally cutoff and blanking values are added to the RGB signals. Cutoff (dark current) is provided by three 9-bit DACs. The adjustment range is 60 % of full scale RGB range. The analogue RGB-outputs are current outputs with current-sink characteristics. The maximum current drawn by the output stage is obtained with peak white RGB. An external half contrast signal can be used to reduce the output current of the RGB outputs to 50% . Cutoff and white-drive current measurement are carried out during the vertical blanking interval. They always use the small bandwidth setting.

5-3-15 CRT Measurement and Control

The display processor is equipped with an 8-bit ADC for all measuring purposes. The ADC is connected to the SENSE input pin. Cutoff and white-drive current measurement are carried out during the vertical blanking interval.

5-3-16 Average Beam Current Limiter

The average beam current limiter (BCL) uses the SENSE input for the beam current measurement. The BCL uses a different filter to average the beam current during the active picture. The filter bandwidth is approx. 2 kHz. The beam current limiter has an automatic offset adjustment that is active two lines before the first cutoff measurement line. The beam current limiter function is located in the front-end. The data exchange between the front-end and the back-end is done via a single-wire serial interface. The beam current limiter allows the setting of a thresh-old current. If the beam current is above the threshold, the excess current is low-pass filtered and used to attenuate the RGB outputs by adjusting the white-drive multipliers for the internal (digital) RGB signals, and the analogue contrast multipliers for the analogue RGB inputs, respectively. The lower limit of the attenuator is programmable, thus a minimum contrast can always be set. During the tube measurement, the ABL attenuation is switched off. After the white-drive measurement line it takes 3 lines to switch back to BCL limited drives and brightness.

5-3-17 Analogue RGB Insertion

The VCT 38xxA allows insertion of external analogue RGB signals. The RGB signal is key-clamped and inserted into the main RGB by the Fast-Blank switch. The external RGB input can be overlaid or underlaid to the digital picture. The external RGB signals can be adjusted independently as regards DC level (brightness) and magnitude (contrast). All signals for analogue RGB insertion (RIN, GIN, BIN, FBLIN) must be synchronised to the horizontal flyback, otherwise a horizontal jitter will be visible. The VCT 38xxA has no means for timing correction of the analogue RGB input signals. RGB signals are not digitalised and therefore cannot be processed by the picture scaler.

5-3-18 Fast-Blank Monitor

The presence of external analog RGB sources can be detected by means of a Fast-Blank monitor. With a special monitor logic it is possible to detect if there is an external RGB source active and if it is a full screen insertion or only a box. The monitor logic is connected directly to the FBLIN pin. The controlling software uses this information to disable all picture format using display scaler.

5-3-19 Vertical and East/West Deflection

The calculations of the vertical and East/West deflection waveforms is done by the internal Fast Processor (FP). The algorithm uses a chain of accumulators to generate the required polynomial waveforms. To produce the deflection waveforms, the accumulators are initialised at the beginning of each field. The initialisation values must be computed by the TV control processor and are written to the front-end once.

5-3-20 EHT Compensation

The vertical waveform can be scaled according to the average beam current. This is used to compensate the effects of electric high-tension changes due to beam current variations. EHT compensation for East/West deflection is done with an offset corresponding to the average beam current.

5-3-21 Reset Function

Reset of all VDP functions is performed by the RESQ pin. When this pin becomes active, all internal registers and counters are lost.

5-3-22 Standby and Power-On

The VDP does not have a standby mode. To disable all the analogue and digital video functions, it is necessary to switch off the supplies for analogue front-end (VSUP AF), analogue back-end (VSUP AB) and digital circuitry (VSUP D).

5-4- Microcontroller

5-4-1 Introduction

The TV controller basically consists of the CPU, RAM, ROM, and a number of peripheral modules.

For instance:

- a memory banking module is included to allow access to more than 64 kB memory.
- a bootloader software is included to allow in-system-downloading of external code to Flash memory via the I 2 C interface.

The TV controller runs the complete software necessary to control a TV set. The software includes control of the audio, video, OSD, and text processors on chip, as well, as control of external devices like tuner or stereo decoder.

Communication between the TV controller and external devices is done either via I 2 C bus interface or via program-mable port pins. The TV Controller is clocked with $f_{OSC} = f_{XTAL} / 2$.

5-4-2 CPU

The CPU is fully compatible to WDC's W65C02 micro-processor. The processor has 8-bit registers/accumulator, an 8-bit data bus, and a 16-bit address bus.

5-4-3 μ - Controller I/O pin configuration and function

There exist different kinds of ports. The universal ports serve as digital I/O and have additional special input and output functions. A subset of the universal ports serves as input for the analogue-to-digital converter.

μ - Controller I/O pin configuration and function table

pin	name	configuration		description
		Stand by	TV ON	
5	Power	Push Pull High	Push Pull Low	Switch OFF / ON SMPS
8	IR	High impedance	High impedance	Interrupt input
10	SC SW	High impedance	High impedance	SCART 1 slow switching – ADC input
9	Mute	Push Pull	Push Pull	Low = Mute active
6	LED	High	Low	
1	KEY 1	High impedance	High impedance	Keyboard input – ADC
2	KEY 2			input
7	OCP	High impedance	High impedance	Over Current Protection – Switch the set to Std by if < 2.

To reduce power consumption in stand by mode all ports not used are configured in high impedance mode.

5-4-4 Tuning

The AFC information is supplied by the demodulator IC, and becomes available on VCT pin 7 for controlling software. The controlling software uses this information for tuner frequency tracking (automatic following). The AFC window is typically between 50 KHz and 100 KHz.

The minimum frequency step of the tuner is 50 KHz.

This AFC function is disabled when a program is tuned using the direct frequency entry or after fine tuning adjustment. Therefore it is recommended to tune channel with the TV search function (manual or ATSS) or using the direct channel entry to enable the Automatic Frequency Control.

5-4-5 Over Current Protection

In case of overload, the collector voltage of TR Q801 will be rise. The voltage on pin 7 of microcontroller rises over reference voltage (about 1.5 V) The controlling software which continuously monitors this voltage will switch the set to stand by mode. To power on the set again the user must switch it off using the main power switch. Appropriate hysteresis guarantees a reliable operation.

5-5 Teletext Display

National character option bits C12, C13, C14 are transmitted in the page header of a given teletext page. The national option bits are intended to change (or exchange) 13 characters within the G0 character set, according to the needs of each national language. However, for Cyrillic and Greek languages, a major character set change (a change of character mapping) needs to be effected for correct display.

These codes represent, for a given broadcaster, the intended language that the teletext page should be displayed in. As there are only 3 bits, there are only 8 codes available to cover all the possible language combinations. This means that for a received code there are several possibilities meanings, and therefore several possibilities for display.

This is not as bad as it first seems, as we use the user-selected OSD language to identify the intention of the broadcaster. For example, a user wishing to see Russian teletext should select Russian OSD language, otherwise he would not have correct teletext display on the TV.

The table below allows the reader to understand the relationship between selected OSD language (which is under user control), the teletext language display (selected by national option bits in transmission page header) and the language mapping (either Latin or Greek/Cyrillic)

An example: For Greek teletext display, (if national option code 1 1 1 is received from the broadcaster), the user should select the Greek OSD language. Even if English, French, German, Italian, Spanish, Dutch, Danish, Finnish, Norwegian or Swedish OSD languages are selected, the teletext will be correctly displayed.

However, if Polish, Hungarian, Czech, Slovakian, Rumanian or Russian OSD are selected, Latin font mapping is selected. The consequence will be incorrect teletext display, with NO GREEK CHARACTERS DISPLAYED. Romanian national font options will be selected.

OSD Language	C 12	C 13	C 14	Teletext Language	ESC Teletext Language	Mapping
English, French, German, Italian, Spanish, Dutch, Danish, Finnish, Norwegian, Swedish, Greek	0	0	0	English	English	Latin
	0	0	1	German	German	Latin
	0	1	0	Swedish/Finnish	Swedish/Finnish	Latin
	0	1	1	Italian	Italian	Latin
	1	0	0	French	French	Latin
	1	0	1	Spanish	Spanish	Latin
	1	1	0	Turkish	Turkish	Latin
	1	1	1	English	Greek	Greek/Cyrillic
Polish, Hungarian, Czech, Slovakian, Rumanian	0	0	0	Polish	Polish	Latin
	0	0	1	German	German	Latin
	0	1	0	Hungarian	Hungarian	Latin
	0	1	1	Lettish/Lithuanian	Lettish/Lithuanian	Latin
	1	0	0	French	French	Latin
	1	0	1	Serb/Croat/Slovenian	Serb/Croat/Slovenian	Latin
	1	1	0	Czech/Slovak	Czech/Slovak	Latin
	1	1	1	Rumanian	Rumanian	LatinRussian
Russian	0	0	0	English	Serbian/Montenegrin	Greek/Cyrillic
	0	0	1	German	German	Latin
	0	1	0	Estonian	Estonian	Latin
	0	1	1	Lettish/Lithuanian	Lettish/Lithuanian	Latin
	1	0	0	English	Russian/Bulgarian	Greek/Cyrillic
	1	0	1	English	Ukrainian	Greek/Cyrillic
	1	1	0	Czech/Slovak	Czech/Slovak	Latin
	1	1	1	Rumanian	Rumanian	Latin

5-6 Sound processing

5-6-1 Analogue sound IF - input section

The input pins ANA_IN1+ and ANA_IN- offer the possibility to connect sound IF sources to the MSP 341xD. The analogue-to-digital conversion of the preselected sound IF signal is done by an A/D converter, whose output is used to control an analogue automatic gain circuit (AGC), providing an optimal level for a wide range of input levels.

5-6-2 Quadrature Mixers

The digital input coming from the integrated A/D converter may contain audio information at a frequency range of theoretically 0 to 9 MHz corresponding to the selected standards. By means of two programmable quadrature mixers, two different audio sources ; for example, NICAM and FM-mono, may be shifted into baseband position.

5-6-3 Phase and AM discrimination

The filtered sound IF signals are demodulated by means of the phase and amplitude discriminator block. On the output, the phase and amplitude is available for further processing.

AM signals are derived from the amplitude information, whereas the phase information serves for FM and NICAM demodulation.

5-6-4 NICAM decoder

In case of NICAM - mode, the phase samples are decoded according the DQPSK - coding scheme. The output of this block contains the original NICAM bitstream.

5-6-5 DSP section

All audio baseband functions are performed by digital signal processing (DSP). The DSP section controls the source and output selection, and the signals processing.

5-6-6 Sound Mode switching

In case of NICAM transmission, the controlling software reads the bit error rate and the operation mode from the NICAM Decoder. When the set is in "Auto detection" mode (default mode after ATSS) the controlling software sets automatically the sound mode (NICAM mono, NICAM Dual 1 or NICAM Dual 2) depending on the transmitted mode.

In the case of 2 Carrier FM transmission, the controlling software reads the transmission mode and the signal quality level from the Stereo Detection Register. When the set is in "Auto detection" mode the controlling software automatically sets the sound mode (mono, Stereo, Dual 1, Dual 2) depending on the transmitted mode.

In "Auto detection" mode the controlling software evaluates the signal quality and automatically switches to the analogue sound carrier 1, if the transmission quality is too poor. To avoid unwanted automatic switching the threshold levels mono to stereo and stereo to mono are different.

In "forced mono" mode (Red OSD in status Display Window), the controlling software configures the MSP341xD to demodulate the analogue (FM or AM) sound carrier 1, no matter the signal quality. The sound mode "forced" or "Autodetect" is stored for each programme.

5-7 Sound amplification

The TDA8944J (TDA8946J) is a stereo BTL audio amplifier capable of delivering 2 x 5W output power to an 8 W load at THD = 10%, using a 12 V power supply and an external heatsink. The voltage gain is fixed at 32dB.

With the three-level MODE input the device can be switched from 'standby' to 'mute' and to 'operating' mode. The TDA 8944J outputs are protected by an internal thermal shutdown protection mechanism and short-circuit protection.

5-7-1 Power amplifier

The power amplifier is a Bridge Tied Load (BTL) amplifier with an all-NPN output stage, capable of delivering a peak output current of 1.5 A.

The BTL principle offers the following advantages :

- Lower peak value of the supply current.
- The ripple frequency on the supply voltage is twice the signal frequency.
- No DC-blocking capacitor
- Good low frequency performance

5-7-2 Mode selection

The TDA894xJ has several functional modes, which can be selected by applying the proper DC voltage to pin MODE.

Mute : In this mode the amplifier is DC biased but not operational (no audio output). This allows the input coupling capacitors to be charged to avoid pop-noise. The device is in mute mode when $2.5\text{ V} < V_{\text{MODE}} < (V_{\text{CC}} - 1.5\text{ V})$.

Operating : In this mode the amplifier is operating normally. The operating mode is activated at $V_{\text{MODE}} < 0.5\text{ V}$.

5-8 Vertical deflection

The vertical driver circuit is a bridge configuration. The deflection coil is connected between the output amplifiers, which are driven in phase opposition. The differential input circuit is voltage driven. The input circuit is especially intended for direct connection to driver circuits which deliver symmetrical current signals, but is also suitable for asymmetrical currents. The output current of these devices is converted to voltages at the input pins via resistors R303 and R304. The differential input voltage is compared with the output current through the deflection coils measured as voltage across R311, which provides internal feedback information. The voltage across R311 is proportional to the output current.

5-8-1 Flyback voltage

The flyback voltage is determined by an additional supply voltage V_{fb} . The principle of operation with two supply voltages (class G) makes it possible to fix the supply voltage V_{p} optimum for the scan voltage and the second supply voltage V_{fb} optimum for the flyback voltage. Using this method, very high efficiency is achieved. The supply voltage V_{fb} is almost totally available as flyback voltage across the coil, this being possible due to the absence of a coupling capacitor.

5-8-2 Protection

The output circuit has protection circuits for :

- Too high die temperature
- overvoltage of output stage A

5-8-3 Guard circuit

The guard signal is not used.

5-8-4 Damping resistor

For HF loop stability a damping resistor (R313,R315) is connected across the deflection coil.

5-8-5 EAST-WEST Amplifier (TDA8358J)

The East-West amplifier is current driven. It can only sink currents of the diode modulator circuit. A feedback resistor R305 is connected between the input and output of this inverting amplifier in order to convert the East-West correction input into an output voltage.

5-9 Power supply (STR F6654)

5-9-1 STR-F6654 general description

The STR-F6654 is an hybrid IC with a build-in MOSFET and control IC, designed for flyback converter type switch mode power supply applications.

5-9-2 Power supply primary part operations

An oscillator generates pulses signals which turn on and off a MOSFET transistor.

5-9-2-1 Start-up circuit : V_{IN}

The start-up circuit is used to start and stop the operation of the control IC, by detecting a voltage appearing at V_{IN} pin (pin 4).

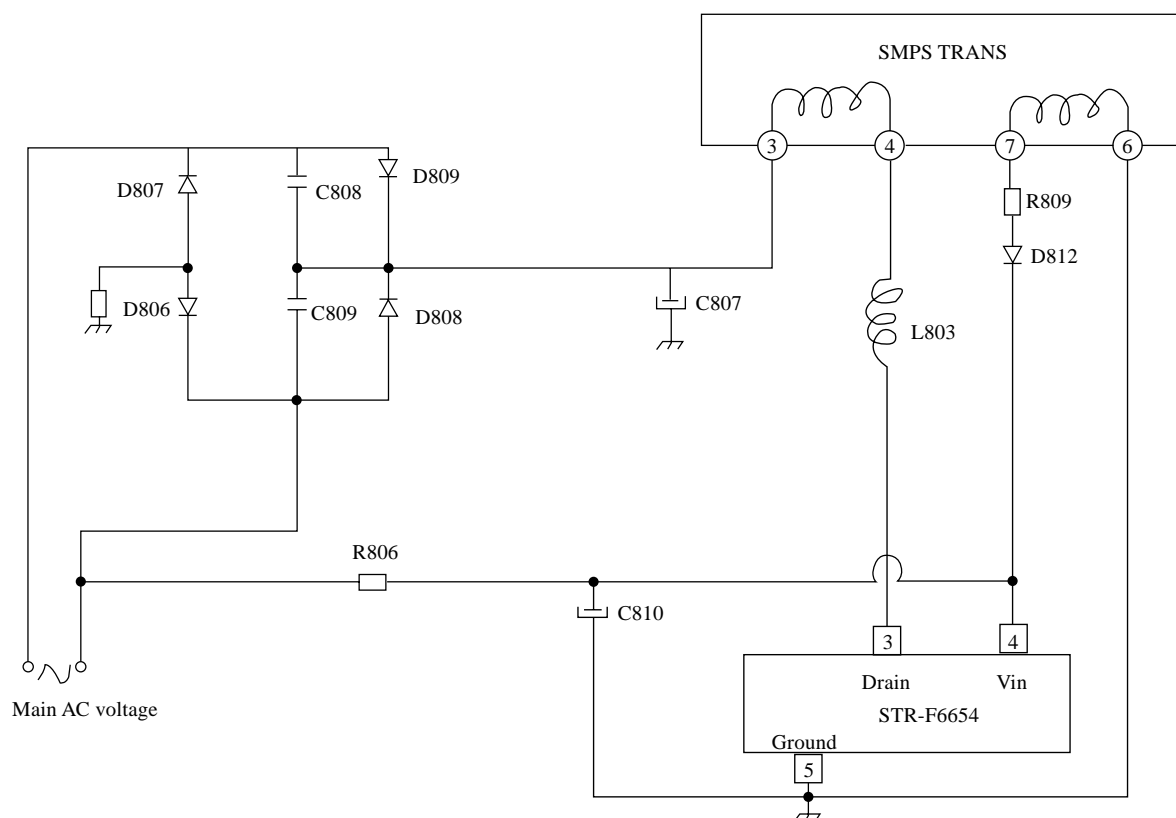


Fig : Power supply start-up circuit

When the power switch is pushed on, V_{IN} increases slowly. During this time, C810 is charged through R806.

As soon as V_{IN} reaches 16V, the STR-F6654 control circuit starts operating. Then, V_{IN} is obtained by smoothing the winding voltage which appears between pin6 and pin7 of the SMPS transformer.

As this winding voltage does not increase to the set voltage immediately after the control circuit starts operating, V_{IN} starts dropping. However, as this winding voltage reaches the set value before V_{IN} voltage drops to the shutdown voltage (at 11V), the control circuit continues operating (see below V_{IN} voltage at start-up). R809 resistor prevents that V_{IN} pin voltage varies according to the secondary side output current.

V_{IN} must be set higher than the shutdown voltage ($V_{IN}(\text{off}) = 11V_{\text{max}}$) and lower than the O.V.P. (overvoltage protection) operating voltage ($V_{\text{OVP}} = 20.5V_{\text{min}}$)

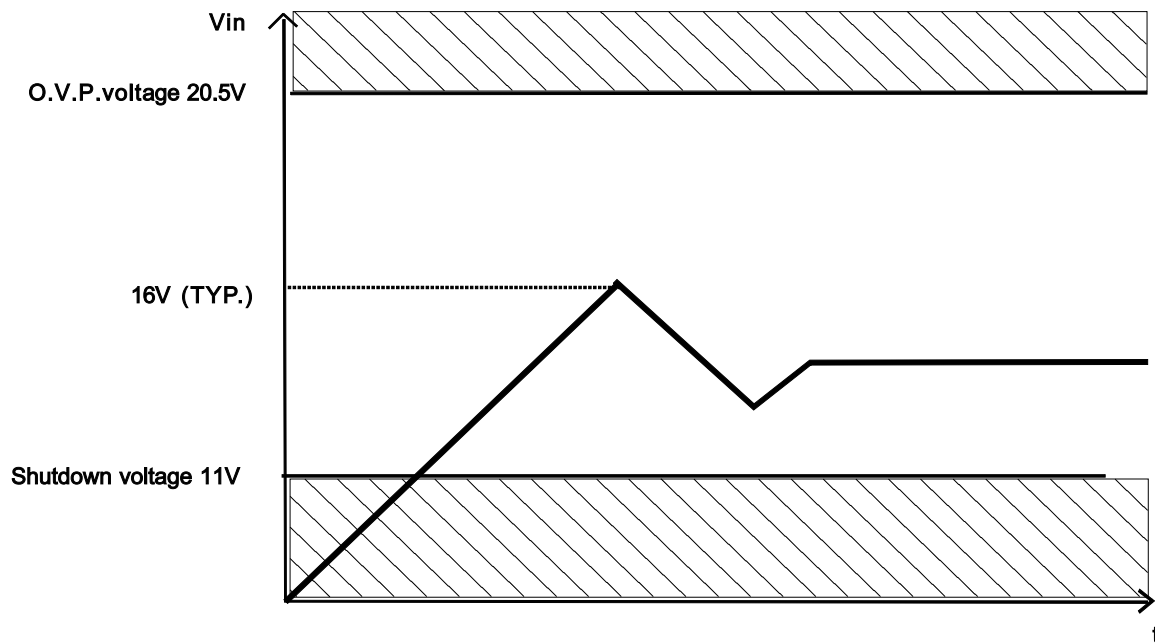


Fig : Waveform of V_{in} pin voltage at start

5-9-2-2 STR-F6654 oscillating operation

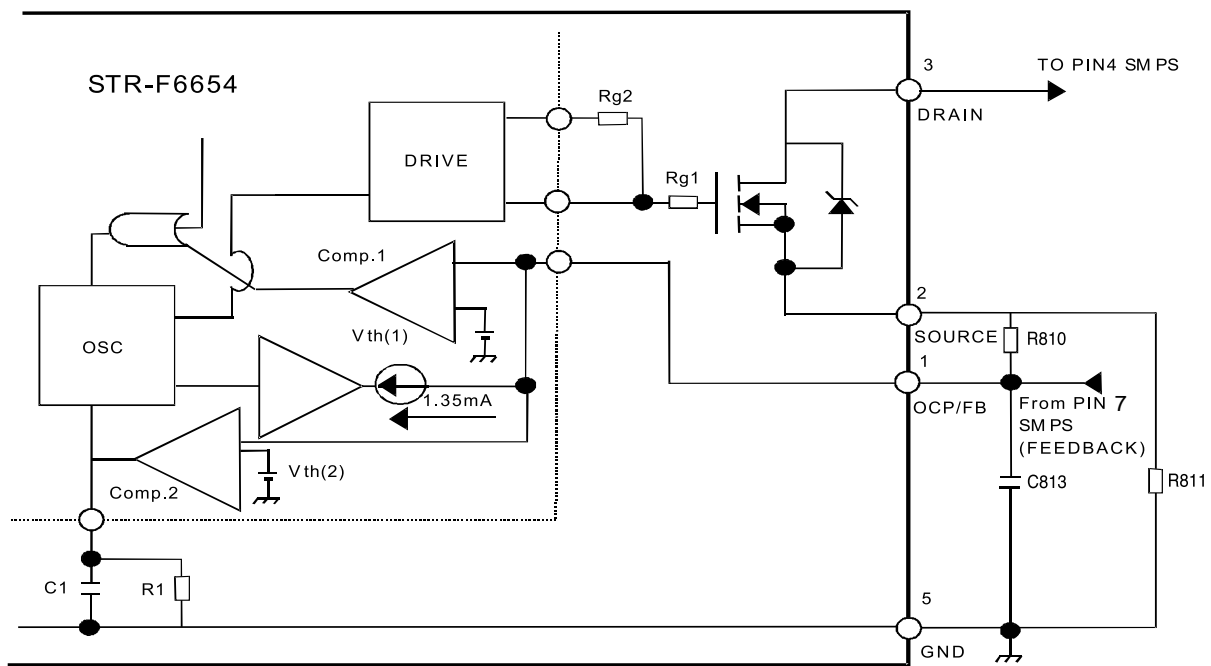


Fig : Oscillating operation

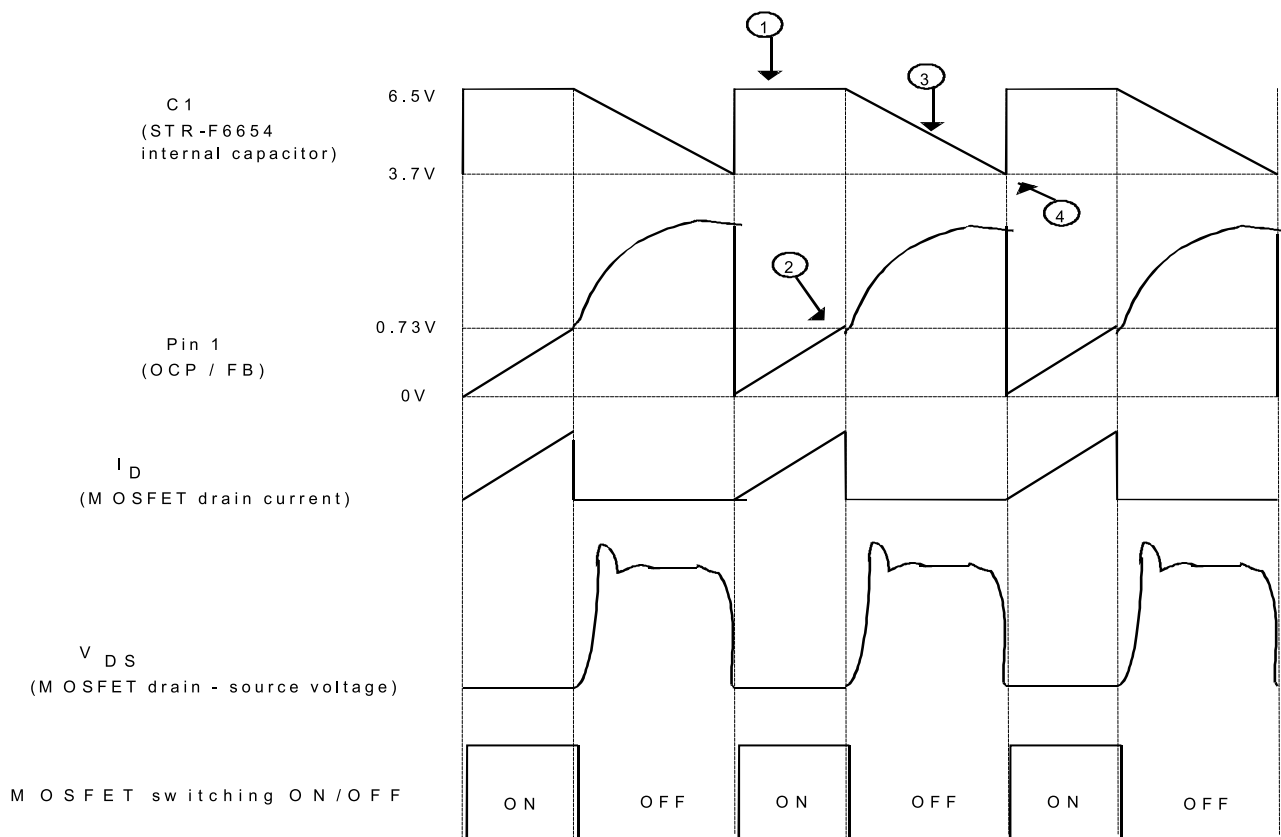


Fig : Waveforms during oscillating operation

- ① When the MOSFET is ON, the STR-F6654 internal capacitor C1 is charged at the constant voltage 6.5V. At the same time, the voltage at pin 1 (OCP / FB) increases with the same waveform as the MOSFET drain current.
- ② When the pin 1 voltage reaches the threshold voltage $V_{TH1} = 0.73V$, the STR-F6654 internal comparator 1 starts operating. The STR-F6654 internal oscillator is inverted and the MOSFET turns OFF.
- ③ When the MOSFET turns OFF, charging of STR-F6654 internal capacitor C1 is released and C1 starts discharging by the STR-F6654 internal resistance R1. So, C1 voltage starts falling in accordance with the gradient regulated by the constant discharging time of C1 and R1. So, this means that the fixed time determined by C1 and R1 is the OFF-time of the MOSFET.
- ④ When C1 voltage falls to around 3.7V, the STR-F6654 internal oscillator is reversed again and the MOSFET turns ON. C1 is quickly charged to around 6.5V

The MOSFET continues to oscillate by repeating the above procedure.

5-9-2-3 STR-F6654 protection circuits

overcurrent protection function (OCP)

Overcurrent protection is performed pulse by pulse detecting at STR-F6654 pin 1 (OCP) the peak of the MOSFET drain current in every pulse.

• latch circuit

This circuit sustains an output low from the STR-F6654 internal oscillator and stops operation of the power supply when overvoltage protection (OVP) and thermal shutdown (TSD) circuit are under operation

• thermal shutdown circuit (TSD)

This circuit triggers the latch circuit when the frame temperature of STR-F6654 IC exceeds 140°C

• overvoltage protection circuit (OVP)

This circuit triggers the latch circuit when the V_{in} voltage exceeds 22V (typ.)

If the TV set was on normal run mode before switching off, the microcontroller delivers horizontal drive voltage at pin 24 picture appears on screen.

If the TV set was on stand-by mode before switching off, the microcontroller switches TV set to stand-by mode, decreasing power pin voltage (pin5)

5-10-2 TV normal run and stand-by mode operations

Depending on remote control commands, I501 microcontroller part pin 5 (power) is set to :

- low for normal run mode.
- high for stand-by mode.

a) TV on normal run mode

* I501 microcontroller part pin 5 (power) effect

I501 microcontroller part pin 5 (power) is connected to the following circuit :

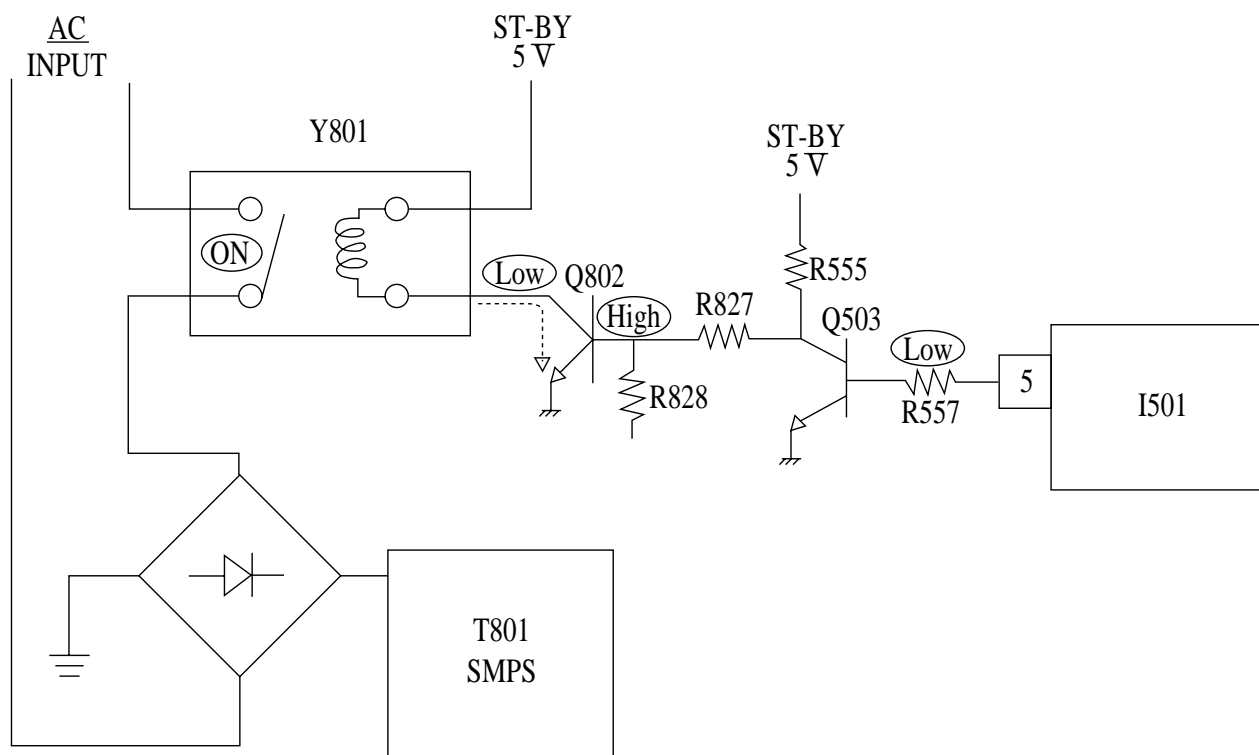


Fig : I501 microcontroller part pin 5 (POWER) effect

On normal run mode, I501 microcontroller pin 5(power) is set to Low

- Q503 is unconducting So, Q802 is conducting.
- So, Q802 collector is connected to the ground and Y801 switch relay is conducting and T801 SMPS Transformer is supply voltage +143V, S.B+, +12 V, +5 V.

*Power supply circuit diagram during TV set normal run

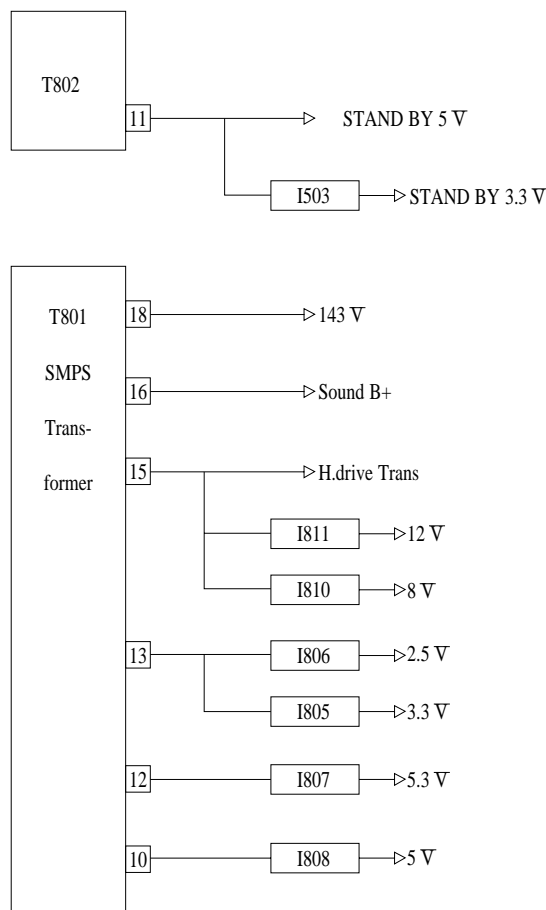


Fig : Power supply operation during TV set normal run

* POWER SUPPLY Voltage during TV set normal run.

FBT VOLTAGE							
VIDEO B+	VERTICAL 16.5V	VERTICAL 45V	H.V at max. beam cur rent	max Beam current	Δ H.V	SCREEN VOLTAGE	HEATER VOLTAGE
180 \pm 10%	12.0 \pm 1V	46 \pm 2V	27.0 \pm 1kV at ib=1100 μ A	1100 \pm 50 μ A	\pm 2kV and less	850~950DVC	6.2+0.1 /-0.2Vrms

SMPS TRANSFORMER VOLTAGE						
MAIN B+	SOUND B+	TV 12V	DVD 5V	TV 5V	DVD 3.3V	
Pin 18	Pin 16	Pin 15	Pin 12	Pin 10	Pin 13	
143 \pm 2V	14.0 \pm 10%	14.0 \pm 10%	8.5 \pm 1V	8.5 \pm 1V	5.0 \pm 10%	

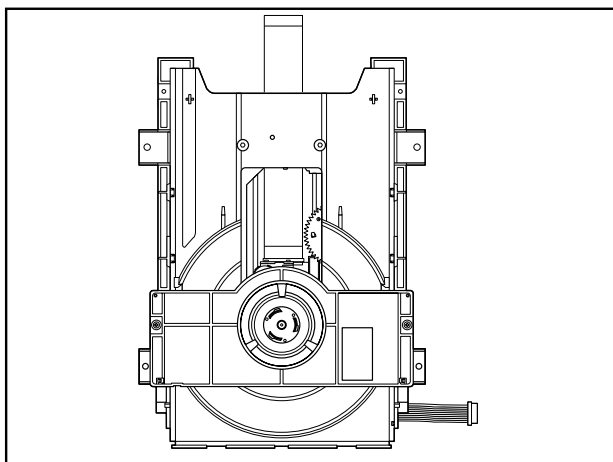
b) TV set on stand-by mode

* TV set circuit diagram on stand-by mode

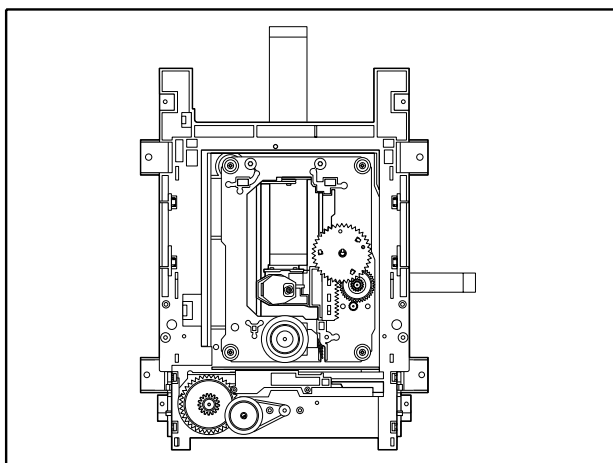
5-11 DVD LOADER

5-11-1 MECHANISM

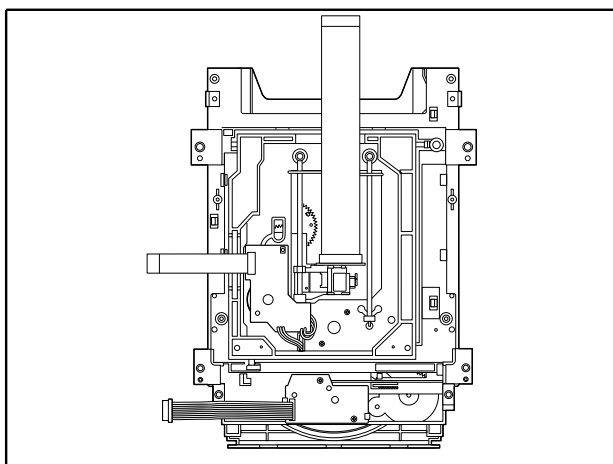
• Top View(With Tray)



• Top View(Without Tray)



• Bottom View



Procedure		Parts	Fixing Type	Disass embly	Figure
Starting No.					
	1	Holder Clamp	2 Screws, 2 Locking Tabs		5-11-1
1	2	Clamp Assmbly Disc	2 Locking Tabs		5-11-1
1, 2	3	Plate Clamp			5-11-1
1, 2, 3	4	Magnet Clamp			5-11-1
1, 2, 3, 4	5	Clamp Upper			5-11-1
1	6	Tray Disc			5-11-2
1, 6	7	Bass Assembly Sled			5-11-3
1, 2, 6	8	Gear Assmbly Feed	4 Screws, 1 Connector 1Locking Tabs		5-11-3
1, 2, 6, 8	9	Gear Middle			5-11-3
1, 2, 6, 8, 9	10	Gear Assembly Rack	1 Screw		5-11-3
1, 2, 7	11	Rubber Rear			5-11-3
1, 2, 7	12	Frame Assembly	1 Screw	Bottom	5-11-4
1, 2	13	Belt Loading	1 Locking Tab		5-11-4
1, 2, 13	14	Gear Pulley			5-11-4
1, 2, 13, 14	15	Gear Loading	1 Locking Tab		5-11-4
1, 2, 7, 12, 13, 14	16	Guide Up/Down			5-11-4
1, 2, 13	17	PWB Assembly Loading	1 Locking Tab 1 Hook 2 Screw	Bottom	5-11-4
1, 2, 7, 12, 13, 14, 15, 16, 17	18	Bass Main	2 Locking Tabs		5-11-4

Note

When reassembling, perform the procedure in reverse order.

The Bottom on Disassembly column of above Table indicates the part should be disassembled at the Bottom side.

DECK MECHANISM DISASSEMBLY

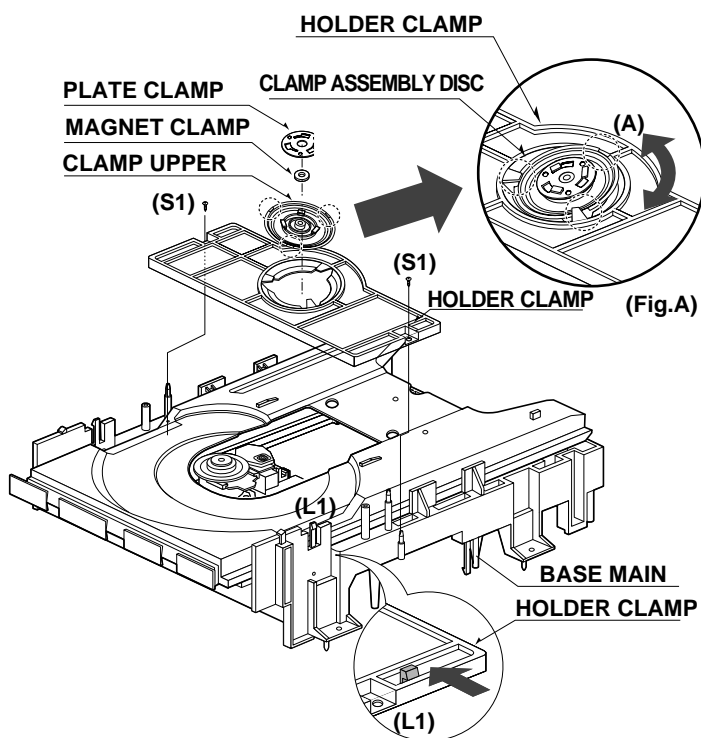


Fig. 5-11-1

1. Holder Clamp (Fig. 5-11-1)

- 1) Release 2 Screws(S1).
- 2) Unhook 2 Locking Tabs(L1).
- 3) Lift up the Holder Clamp and then separate it from the Base Main.

1-1. Clamp Assembly Disc

- 1) Place the Clamp Assembly Disc as Fig. (A)
- 2) Lift up the Clamp Assembly Disc in direction of arrow(A).
- 3) Separate the Clamp Assembly Disc from the Holder Clamp.

1-1-1. Plate Clamp

- 1) Turn the Plate Clamp to counterclockwise direction and then lift up the Plate Clamp.

1-1-2. Magnet Clamp

1-1-3. Clamp Upper

2. Tray Disc (Fig. 5-11-2)

- 1) Insert and push a Driver in the emergency eject hole(A) at the right side, or put the Driver on the Lever(B) of the Gear Emergency and pull the Lever(B) in direction of arrow so that the Tray Disc is ejected about 15~20mm.
- 2) Pull the Tray Disc until it is separated from the Base Main completely.

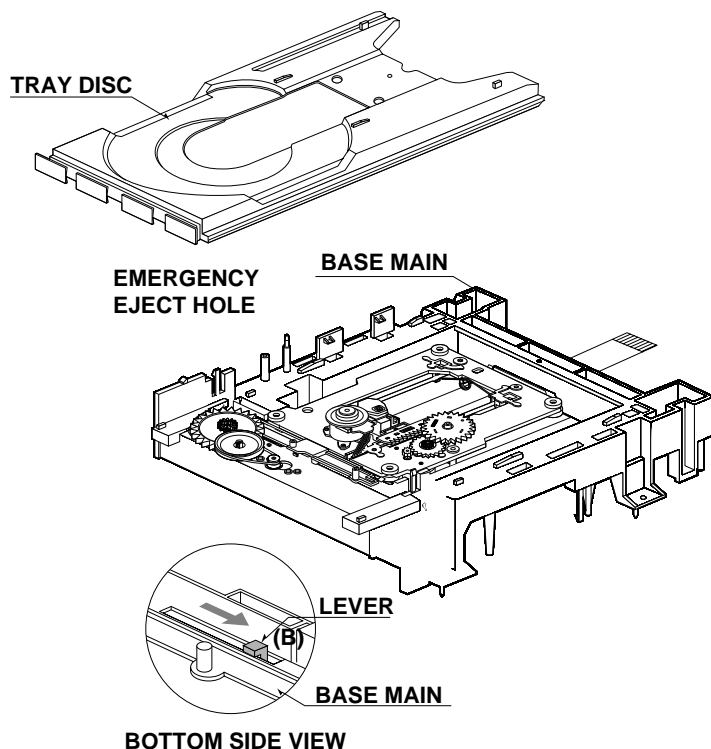


Fig. 5-11-2

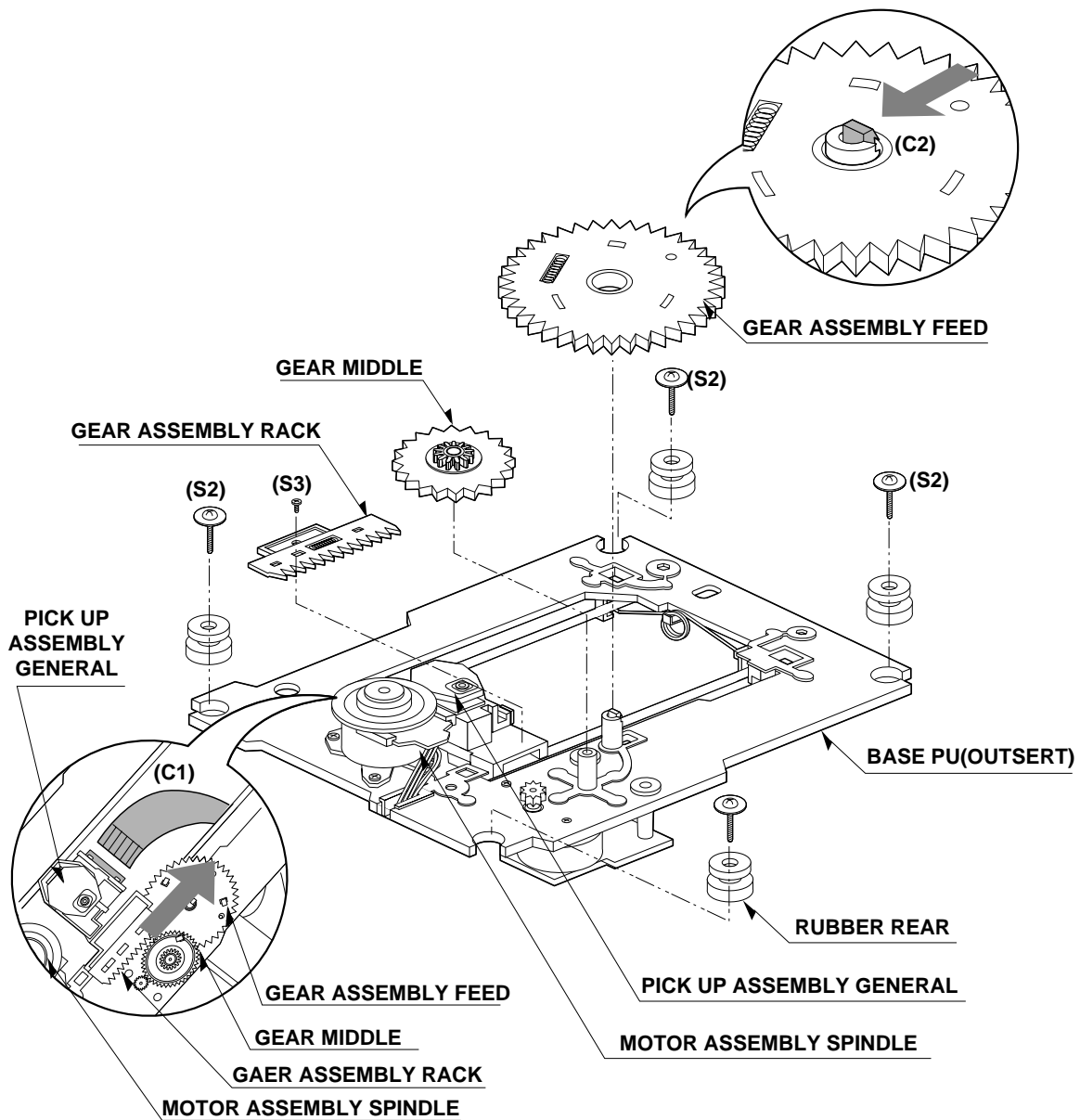


Fig. 5-11-3

3. Base Assembly Sled (Fig. 5-11-3)

- 1) Release 4 Screw(S2).
- 2) Disconnect the FFC Connector(C1)

3-1. Gear Assembly Feed

- 1) Unhook the Locking Tab(L2) in direction of arrow.

3-2. Gear Middle

3-3. Gear Assembly Rack

- 1) Release the Screw(S3)

4. Rubber Rear (Fig. 5-11-3)

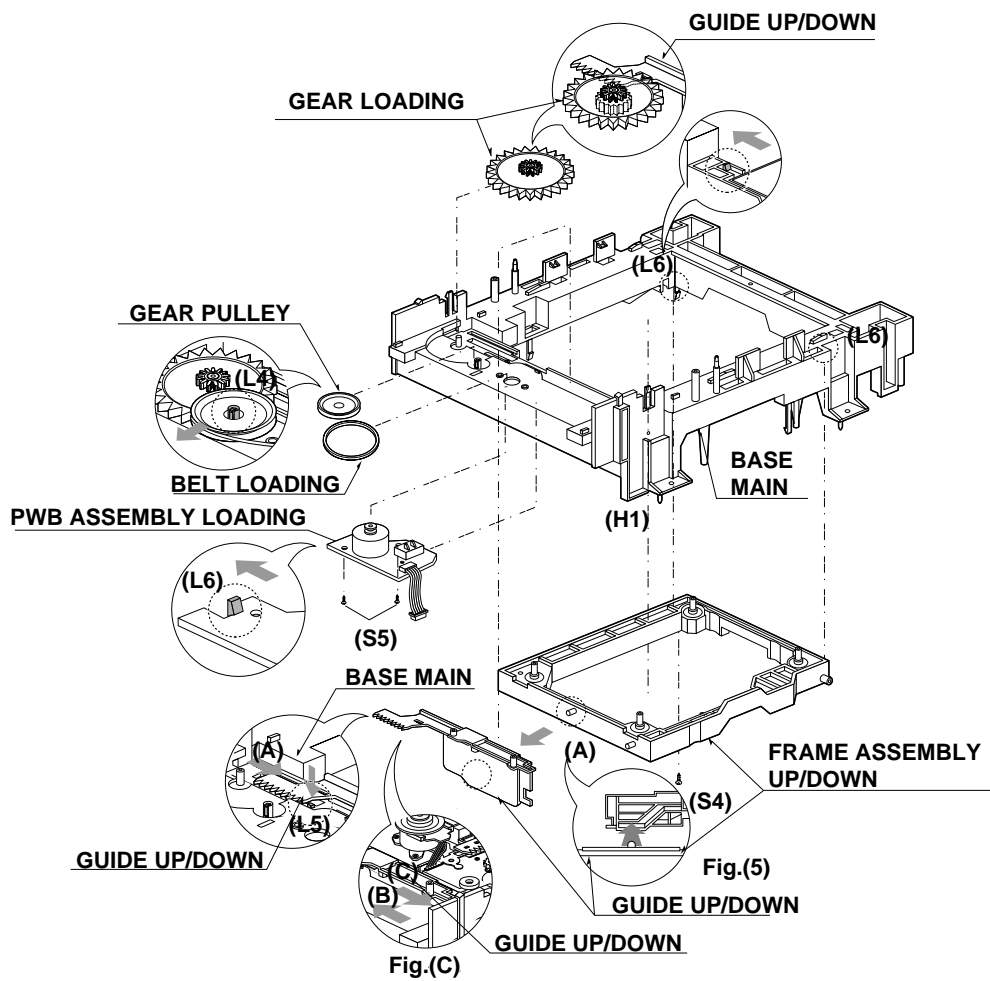


Fig. 5-11-4

5. Frame Assembly Up/Down

[Note]

Put the Base Main face down(Bottom Side)

- 1) Release the Screw(S4)
- 2) Unlock the Locking Tab(L3) in direction of arrow and then lift up the Frame Assembly Up/Down to separate it from the Base Main.

[Note]

¥When reassembling move the Guide Up/Down in direction of arrow(C) until it is positioned as Fig.(C).

¥When reassembling insert (A) portion of the Frame Assembly Up/Down in the (B) portion of the Guide Up/Down as Fig.(B)

6. Belt Loading(Fig. 5-11-4)

[Note]

Put the Base Assembly Main on original position (Top Side)

7. Gear pulley (Fig. 5-11-4)

- 1) Unlock the Locking Tab(L4) in direction of arrow(B) and then separate the Gear Pulley from the Base Main.

8. Gear Loading (Fig. 5-11-4)

9. Guide Up/Down (Fig. 5-11-4)

- 1) Move the Guide Up/Down in direction of arrow(A) as Fig.(A)
- 2) Push the Locking Tab(L5) down and then lift up the Guide Up/Down to separate it from the Base Main.

[Note]

When reassembling place the Guide Up/Down as Fig.(C) and move it in direction arrow(B) until it is locked by the Locking Tab(L5). And confirm the Guide Up/Down as Fig.(A)

10. PWB Assembly Loading

[Note]

Put the Base Main face down(Bottom Side)

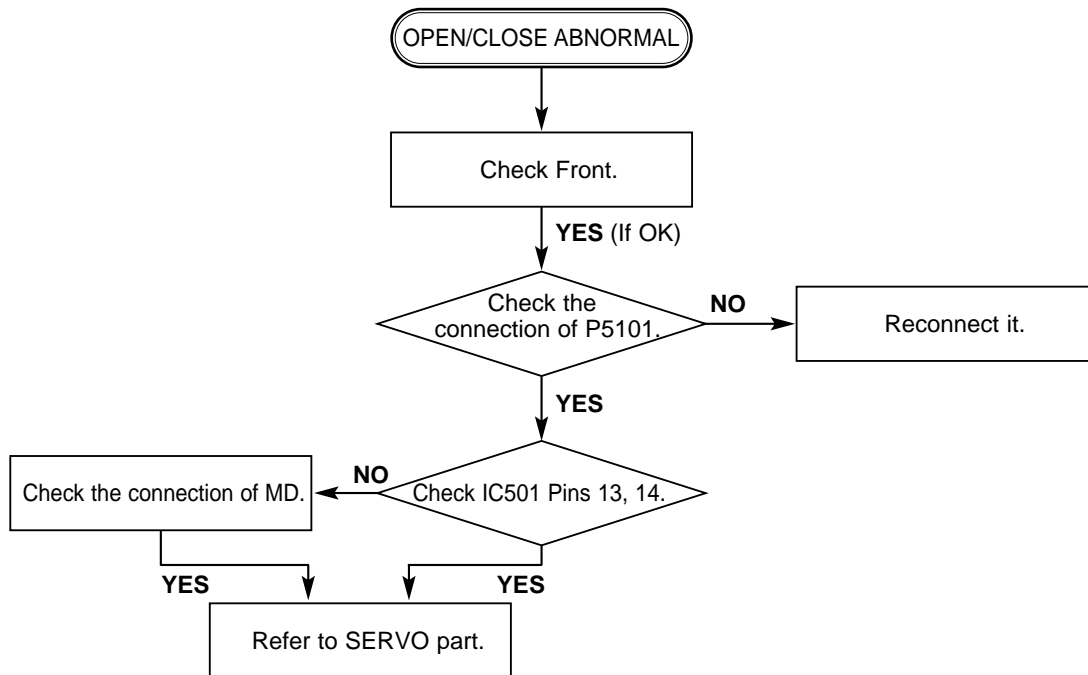
- 1) Release 2 Screws(S5)
- 2) Unhook the Loading Motor Connector (C2) from the Hook (H1) on the Base Main.
- 3) Unlock 2 Locking Tabs(L6) and separate the PWB Assembly Loading from the Base Main.

11. Base Main(Fig. 5-11-4)

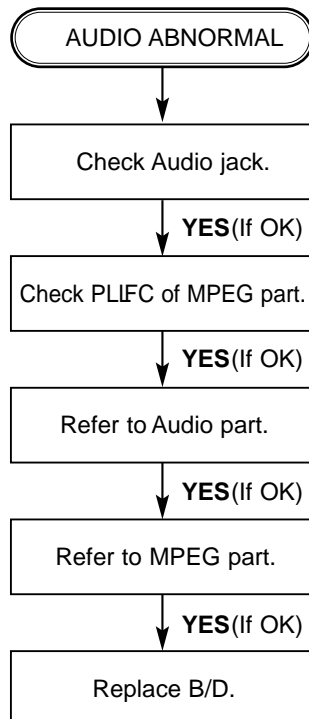
5-11-2 ELECTRICAL TROUBLESHOOTING GUIDE

1. μ -COM Circuit

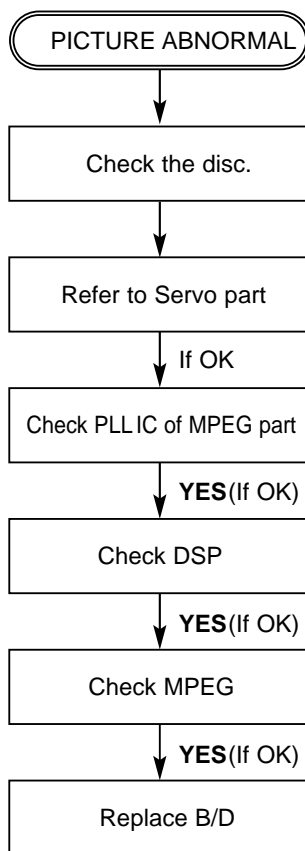
A. Open/Close abnormal



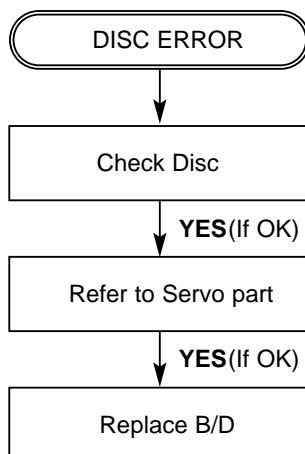
B. Video abnormal



C. Picture abnormal

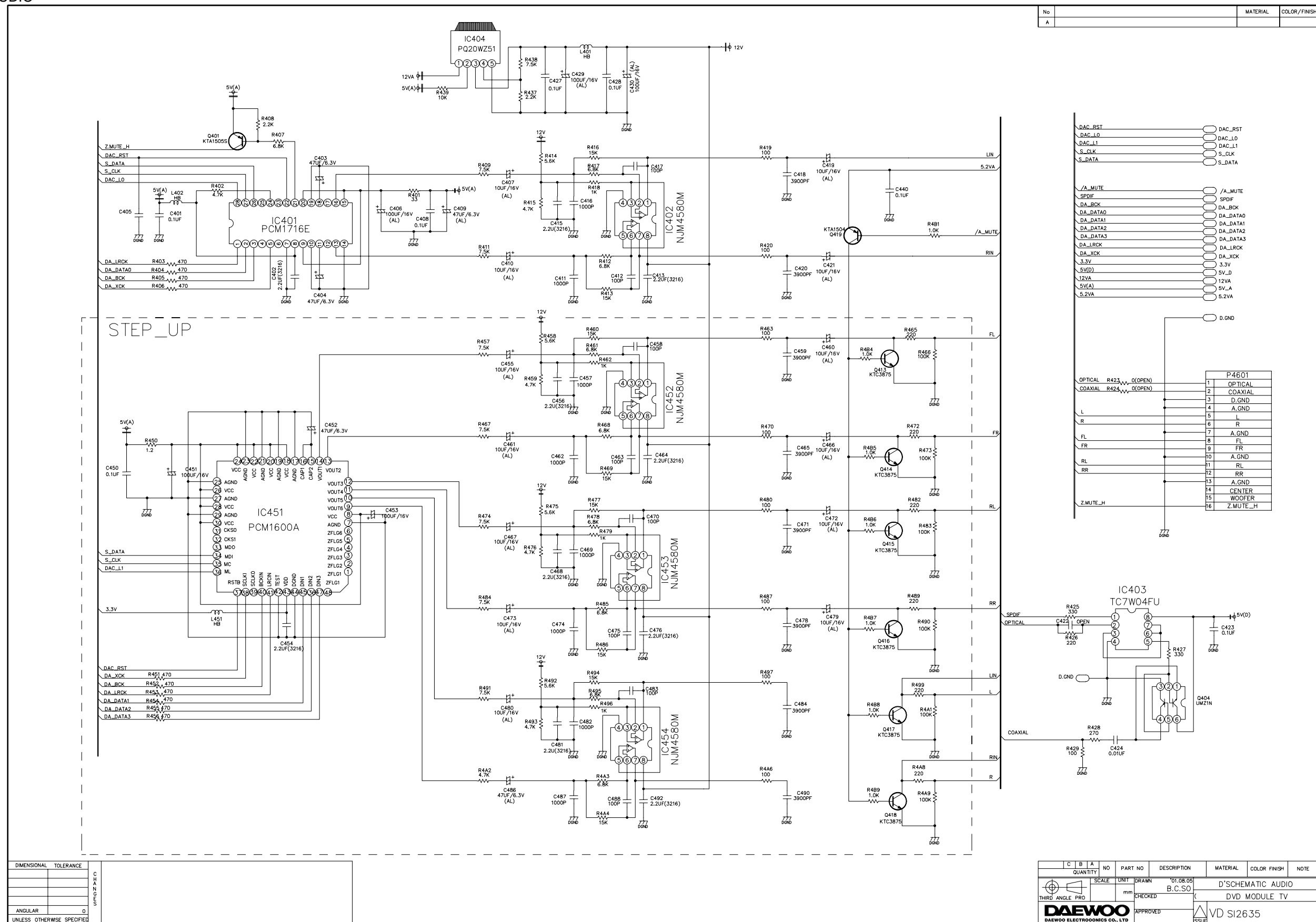


C. Disc Error

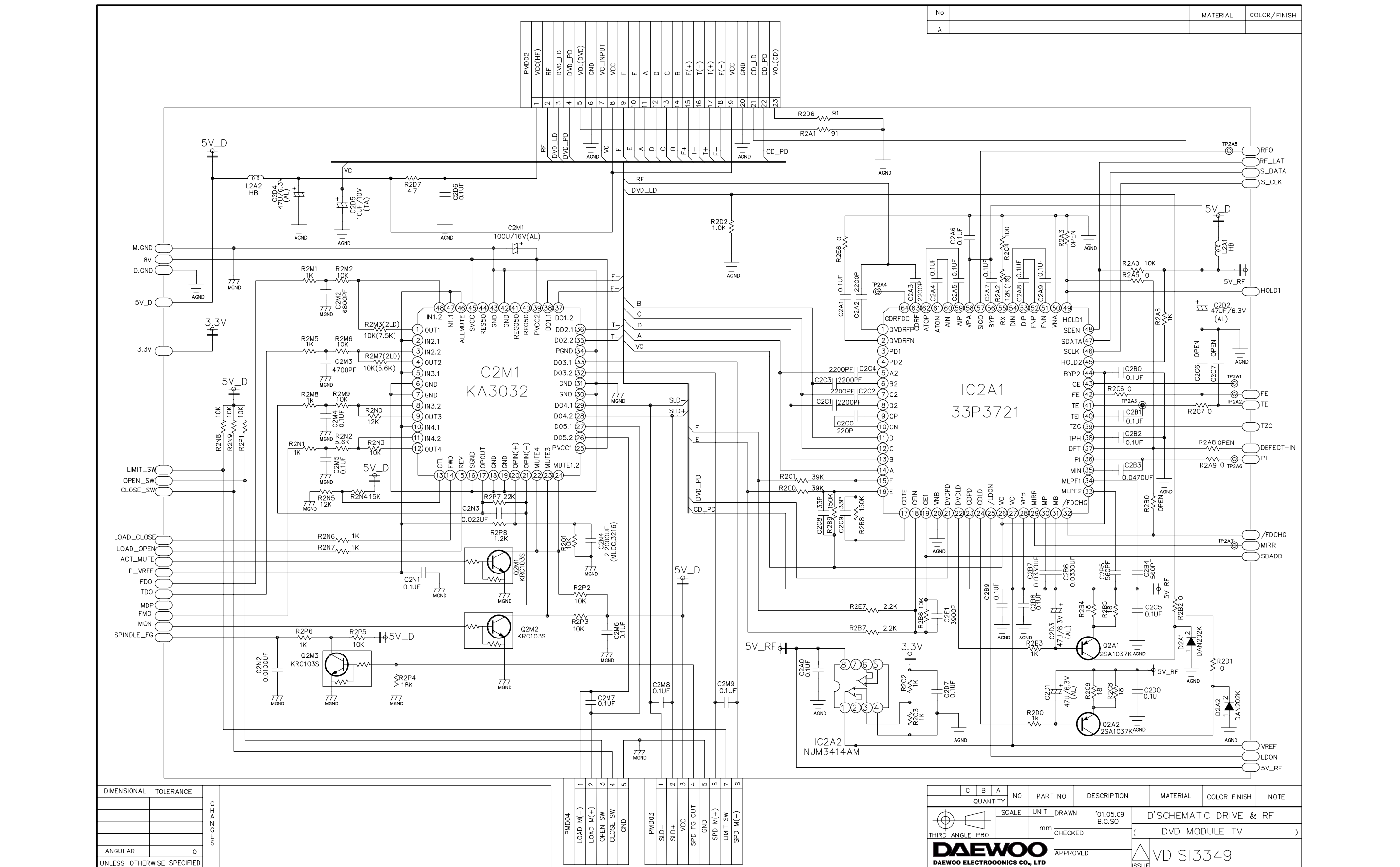


5-11-3 SCHEMATIC DIAGRAM

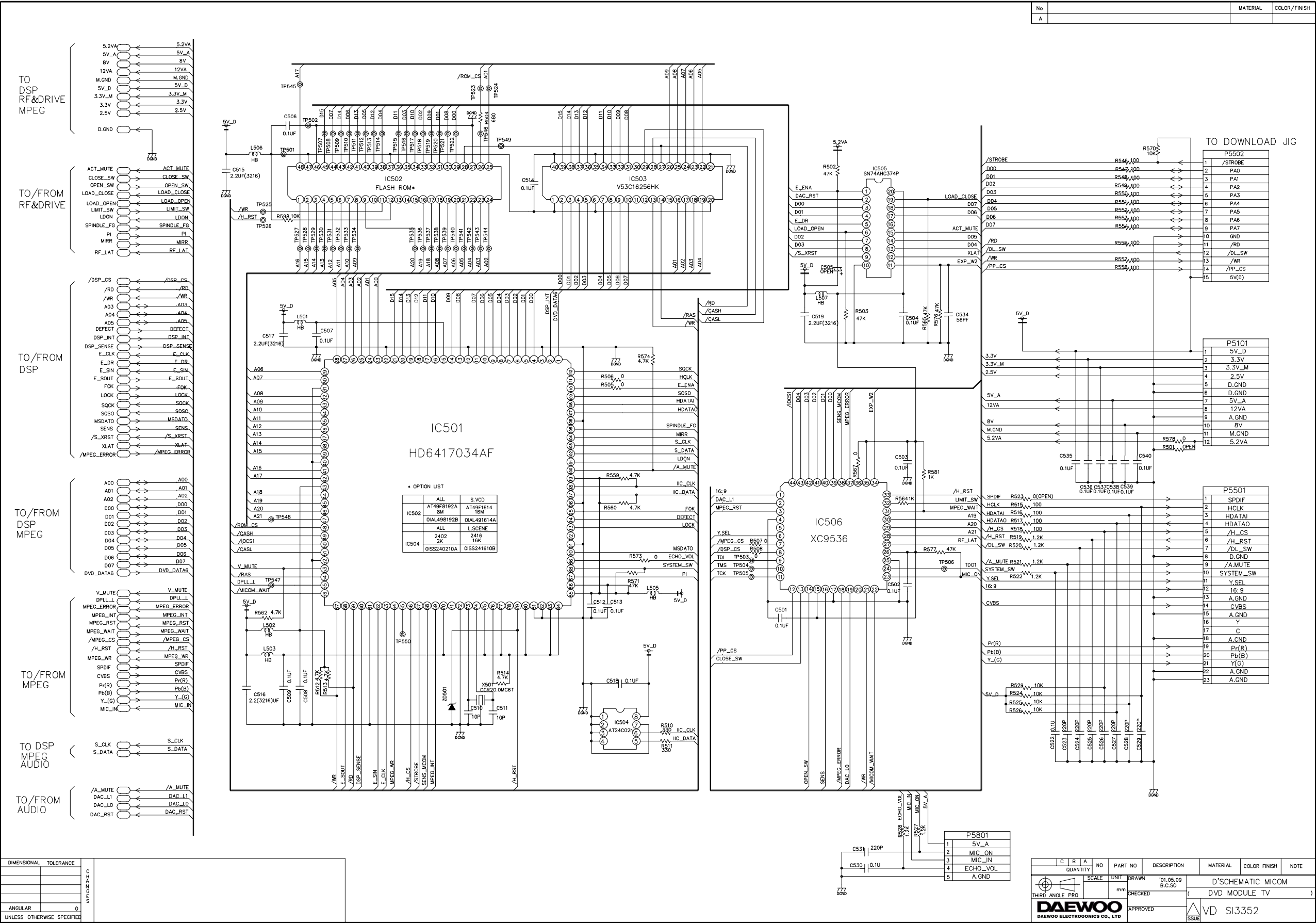
5-11-3-1 AUDIO



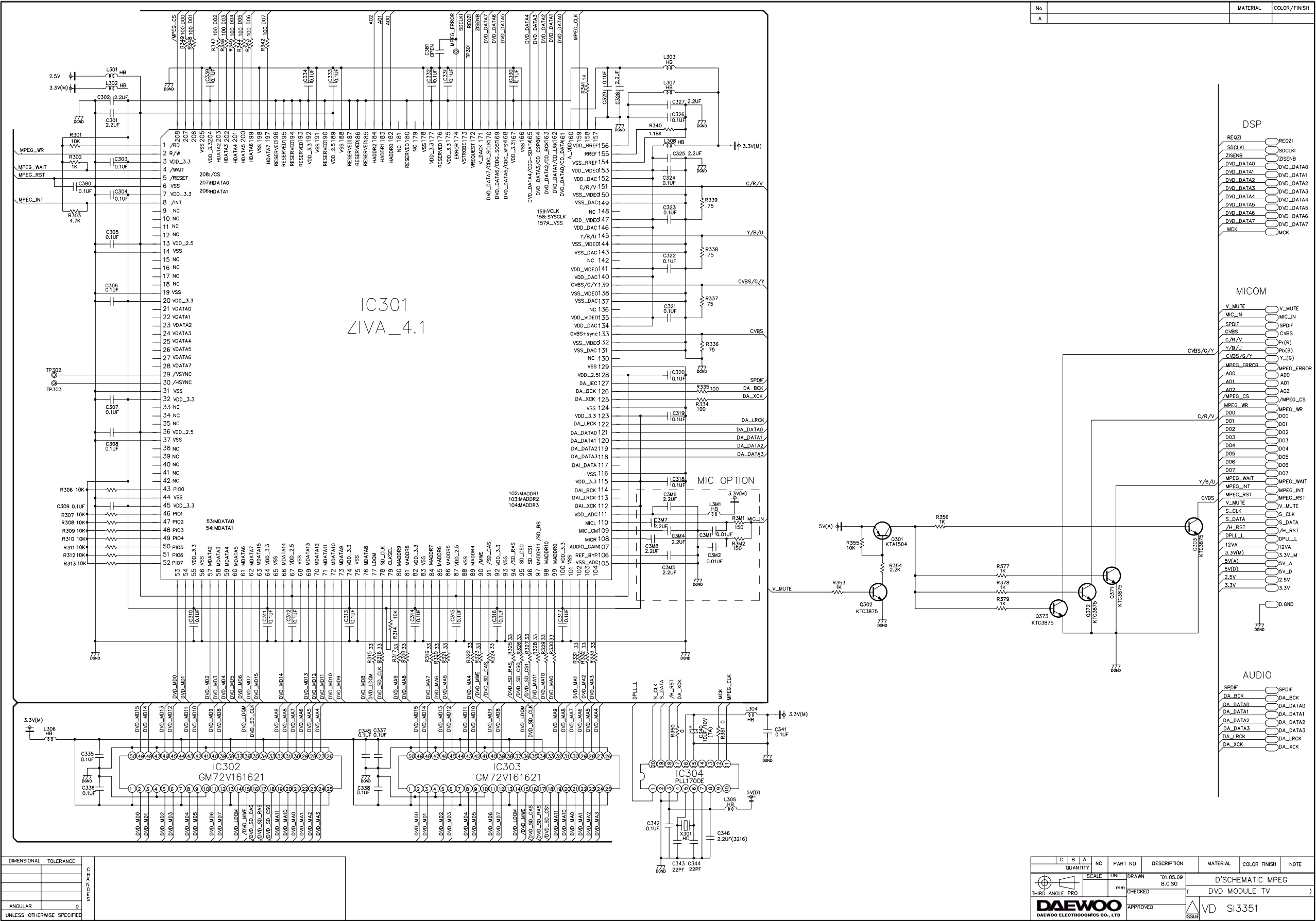
5-11-3-2 DRIVE & RF



5-11-3-4 MICOM



5-11-3-5 MPEG



6. Service Parts List

DDT-21H9ZZF / ZZR

CAUTION

"⚠" Parts recommended for stock.

"®" Safety critical component, Replace only with genuine Daewoo safety parts.

LOC	PARTS CODE	PARTS NAME	DESCRIPTION	REMARK	LOC	PARTS CODE	PARTS NAME	DESCRIPTION	REMARK
ZZ100	48B552B02	TRANSMITTER REMOCON	R-52B02 (AAA)	®	I602	PTC2SW4422	HEAT SINK ASS'Y	1TDA8944J- + 7174300811	
ZZ110	PTACPWD572	ACCESSORY AS	DDT-21H9ZZF		00001	1TDA8944J-	IC SOUND	TDA8944J	®
00010	4850Q00910	BATTERY	R03/NN		0000A	4857024422	HEAT SINK	AL EX	
ZZ120	PTBCSHD572	COVER BACK AS	DDT-21H9ZZF		0000B	7174300811	SCREW TAPPTITE	TT2 RND 3X8 MFZN	
M211	4852161301	COVER BACK	HIPS GY 21H9		IQ01	1KRT30----	IC PREAMP	KRT30	®
M781	4857817610	CLOTH BLACK	FELT 300X20X0.7		JPA1	4859200401	SOCKET RGB	YRS21-R1	
ZZ130	PTPKCPD572	PACKING AS	DDT-21H9ZZF		JPA4	4859111850	JACK PIN BOARD	PH-JB-9614F	
10	6520010100	STAPLE PIN	AUTO W65		M191A	7178301211	SCREW TAPTITE	TT2 WAS 3X12 MFZN	
M801	4858061200	BOX CARTON	DW-3 21H9		M193	485AS00110	DVD ASSY	MGD301PDM	
M811	4858199500	PAD	EPS 21H9		M221	4852221700	CABINET BOTTOM	FR HIPS BK 21H9	
M821	4858215000	BAG P.E	PE FOAM t0.5x1200x1150		M221A	7178300811	SCREW TAPPTITE	TT2 WAS 3X8 MFZN	
ZZ131	48519A7110	CRT GROUND NET	2101F-1015-1P		M221B	7178301212	SCREW TAPPTITE	TT2 WAS 3X12 MFZN BK	
ZZ132	58G0000154	COIL DEGAUSSING	DC-21F1	⚠	M391	4853953700	BRKT EARTH	C512P-1/2M T0.2	
ZZ140	PTCACAD572	CABINET AS	DDT-21H9ZZF		M392	4853953700	BRKT EARTH	C512P-1/2M T0.2	
M111	4851115200	PANEL CONTROL ASSY	23285+49520+55463+48618		M721	4857249100	SHIELD CASE	ET T0.5 21L6	
M201A	4856013300	SCREW CRT FIXING	30X80 BK		M722	4857249200	SHIELD BOTTOM	ET T0.4 21L6	
M201B	4856013302	SCREW CRT FIXING	30X190 BK		M722A	7178301011	SCREW TAPPTITE	TT2 WAS 3X10 MFZN	
M201C	4856215401	WASHER RUBBER	CR T1.0		P4601	4859293220	CONN WAFER	GF102-16S-TS	
M211A	7172401612	SCREW TAPPTITE	TT2 TRS 4X16 MFZN BK		P502	4859235520	CONN WAFER	YW025-12	
M281	4852823301	DOOR CD	ABS GY 21H9		P5501	4859293320	CONN WAFER	GF102-23S-TS	
M281A	4855800018	LABEL(BADGE DVD)	NH+CR		PA460	4859200570	CONN FFC	K-16X150-1.00	
M541	4855415800	SPEC PLATE	150ART P/E FILM (C/TV)		PA501	4850706S02	CONNECTOR	YH025-06+YBNH250+ULW=400	
M561	48556175SD	MARK BRAND	SILVER DIA-CUTTING		PA510	4850712N01	CONNECTOR	YH025-12+GIL-S-12S+ULW200	
SP601	7172401212	SCREW TAPPTITE	TT2 TRS 4X12 MFZNBK	®	PA550	4859200670	CONN FFC	K-23X100-1.00	
SP602	7172401212	SCREW TAPPTITE	TT2 TRS 4X12 MFZNBK	®	PA803	4850712V11	CONNECTOR	YH025-12+YST025+ULW=200	
V901	PTRTPWD572	CRT AS	DDT-21H9ZZF		PA804	4850709S01	CONNECTOR	YH025-09+YST025+ULW=200	
PA401	4850704N07	CONNECTOR	SE100J+172792+USW=500		R564	RS01Y221J-	R M-OXIDE FILM	1W 220 OHM J	
V901	4859634860	CRT	A51ERF135X70	® ⚠	SW01	5S40202144	SW PUSH	SPUL19	
ZZ200	PTFMSJD572	MASK FRONT AS	DDT-21H9ZZF		U101	4859722630	TUNER VARACTOR	TECC2949PG35W	®
M201	4852080501	MASK FRONT	HIPS GY 21H9		X501	5XE20R250E	CRYSTAL QUARTZ	HC-49/U 20.2500MHZ 30PPM	
ZZ202	PTSPPWD572	SPEAKER AS	DDT-21H9ZZF		X601	5XE18R432E	CRYSTAL QUARTZ	HC-49/U 18.43200MHZ 30PPM	
PA601	4850703S52	CONNECTOR	YH025-03+35098+ULW=400		Z101	5PK3953M--	FILTER SAW	K3953M	
PA602	4850703S52	CONNECTOR	YH025-03+35098+ULW=400		Z102	5PK9650M--	FILTER SAW	K9650M	
SP601	4858313510	SPEAKER	SP-50110F05		Z501	5PYXT5R5MB	FILTER CERA	XT 5.5MB	
SP602	4858313510	SPEAKER	SP-50110F05		ZZ200	PTMPJ2D572	PCB CHIP MOUNT B AS	DDT-21H9ZZF	
ZZ290	PTMPMSD572	PCB MAIN MANUAL AS	DDT-21H9ZZF		IC101	1TDA9886T-	IC IF CHIP	TDA9886T	
10	2193102005	SOLDER BAR	SN:PB=63:47 S63S-1320		ZZ200	PTMPJ0D572	PCB MAIN (RHU) AS	DDT-21H9ZZF	
30	2291050616	FLUX SOLDER	JS-64T3		C542	CEXF1C471V	C ELECTRO	16V RSS 470MF (8X12)TP	
40	2291050301	FLUX SOLVENT	IM-1000		C545	CEXF1C471V	C ELECTRO	16V RSS 470MF (8X12)TP	
DQ01	DLH3PRG---	LED BLOCK	LH-3P-RG		C626	CEXF1C222V	C ELECTRO	16V RSS 2200MF (16X31.5) TP	
DQ02	DLH3PRG---	LED BLOCK	LH-3P-RG		ZZ200	PTMPJBD572	PCB MAIN M-10 AS	DDT-21H9ZZF	
I502	1CAT24C16P	IC MEMORY	CAT24WC16P	®	10	2TM18006BE	TAPE MASKING	6.2X500	
I503	1LP295033-	IC REGULATOR	LP2950 3.3V		P601	485923162S	CONN WAFER	YW025-03 (STICK)	
I504	1K1A7025AP	IC RESET	KIA7025AP		P602	485923162S	CONN WAFER	YW025-03 (STICK)	
I601	1MSP3410V3	IC SOUND	MSP3410G-V3	®	ZZ200	PTMPJRD572	PCB MAIN RADIAL AS	DDT-21H9ZZF	

Service Manual CP-099F

LOC	PARTS CODE	PARTS NAME	DESCRIPTION	REMARK	LOC	PARTS CODE	PARTS NAME	DESCRIPTION	REMARK
C101	CEXF1E470V	C ELECTRO	25V RSS 47MF (5X11) TP		C632	CMXM2A224J	C MYLAR	100V 0.22MF J	
C103	CEXF1E470V	C ELECTRO	25V RSS 47MF (5X11) TP		C634	CMXM2A224J	C MYLAR	100V 0.22MF J	
C109	CMXM2A224J	C MYLAR	100V 0.22MF J		C635	CMXM2A224J	C MYLAR	100V 0.22MF J	
C110	CEXF1H478V	C ELECTRO	50V RSS 0.47MF (5X11) TP		C638	CEXF1E470V	C ELECTRO	25V RSS 47MF (5X11) TP	
C111	CXCH1H180J	C CERA	50V CH 18PF J (TAPPING)		C640	CEXF1H220V	C ELECTRO	50V RSS 22MF (5X11) TP	
C113	CEXF1E470V	C ELECTRO	25V RSS 47MF (5X11) TP		C641	CEXF1E470V	C ELECTRO	25V RSS 47MF (5X11) TP	
C115	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP		C642	CEXF1E470V	C ELECTRO	25V RSS 47MF (5X11) TP	
C120	CEXF1H478V	C ELECTRO	50V RSS 0.47MF (5X11) TP		CQ02	CEXF1E470V	C ELECTRO	25V RSS 47MF (5X11) TP	
C503	CXCH1H309C	C CERA	50V CH 3PF C		CQ04	CEXF1E470V	C ELECTRO	25V RSS 47MF (5X11) TP	
C504	CXCH1H309C	C CERA	50V CH 3PF C		Q101	TKTC3198Y-	TR	KTC3198Y	
C506	CEXF1E470V	C ELECTRO	25V RSS 47MF (5X11) TP		Q102	TKTC3198Y-	TR	KTC3198Y	
C511	CEXF1H220V	C ELECTRO	50V RSS 22MF (5X11) TP		Q501	TKTC3198Y-	TR	KTC3198Y	
C512	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP		Q502	TKTC3198Y-	TR	KTC3198Y	
C515	CEXF1E470V	C ELECTRO	25V RSS 47MF (5X11) TP		Q503	TKTC3198Y-	TR	KTC3198Y	
C516	CEXF1H109V	C ELECTRO	50V RSS 1MF (5X11) TP		Q504	TKTA1266Y-	TR	KTA1266Y (TP)	
C517	CEXF1H109V	C ELECTRO	50V RSS 1MF (5X11) TP		Q505	TKTA1266Y-	TR	KTA1266Y (TP)	
C518	CEXF1H109V	C ELECTRO	50V RSS 1MF (5X11) TP		Q506	TKTA1266Y-	TR	KTA1266Y (TP)	
C519	CEXF1H109V	C ELECTRO	50V RSS 1MF (5X11) TP		Q507	TKTC3198Y-	TR	KTC3198Y	
C520	CEXF1H109V	C ELECTRO	50V RSS 1MF (5X11) TP		Q508	TKTA1266Y-	TR	KTA1266Y (TP)	
C521	CEXF1H109V	C ELECTRO	50V RSS 1MF (5X11) TP		Q511	TKTC3198Y-	TR	KTC3198Y	
C522	CEXF1H339V	C ELECTRO	50V RSS 3.3MF (5X11) TP		Q512	TKTC3198Y-	TR	KTC3198Y	
C523	CBXF1H104Z	C CERA SEMI	50V F 0.1MF Z (TAPPING)		Q513	TKTA1266Y-	TR	KTA1266Y (TP)	
C524	CEXF1E470V	C ELECTRO	25V RSS 47MF (5X11) TP		Q514	TKTC3198Y-	TR	KTC3198Y	
C529	CEXF1E470V	C ELECTRO	25V RSS 47MF (5X11) TP		Q515	TKTC3198Y-	TR	KTC3198Y	
C531	CEXF1E101V	C ELECTRO	25V RSS 100MF (6.3X11) TP		Q516	TKTC3198Y-	TR	KTC3198Y	
C543	CEXF1E470V	C ELECTRO	25V RSS 47MF (5X11) TP		Q517	TKTC3198Y-	TR	KTC3198Y	
C547	CEXF1E221V	C ELECTRO	25V RSS 220MF (8X11.5) TP		Q518	TKTC3198Y-	TR	KTC3198Y	
C549	CEXF1H220V	C ELECTRO	50V RSS 22MF (5X11) TP		Q519	TKTC3198Y-	TR	KTC3198Y	
C552	CEXF1E101V	C ELECTRO	25V RSS 100MF (6.3X11) TP		QQ01	TKTC3198Y-	TR	KTC3198Y	
C554	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP		QQ02	TKTC3198Y-	TR	KTC3198Y	
C562	CEXF1E470V	C ELECTRO	25V RSS 47MF (5X11) TP		QQ04	TKTA1266Y-	TR	KTA1266Y (TP)	
C563	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP		SW02	5S50101Z90	SW TACT	THVV502GDA	
C601	CEXF1E470V	C ELECTRO	25V RSS 47MF (5X11) TP		SW03	5S50101Z90	SW TACT	THVV502GDA	
C603	CEXF1H220V	C ELECTRO	50V RSS 22MF (5X11) TP		SW04	5S50101Z90	SW TACT	THVV502GDA	
C604	CXCH1H309C	C CERA	50V CH 3PF C		SW05	5S50101Z90	SW TACT	THVV502GDA	
C605	CXCH1H309C	C CERA	50V CH 3PF C		SW06	5S50101Z90	SW TACT	THVV502GDA	
C608	CEXF1E470V	C ELECTRO	25V RSS 47MF (5X11) TP		SW07	5S50101Z90	SW TACT	THVV502GDA	
C610	CBXF1H104Z	C CERA SEMI	50V F 0.1MF Z (TAPPING)		SW08	5S50101Z90	SW TACT	THVV502GDA	
C611	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP		SW09	5S50101Z90	SW TACT	THVV502GDA	
C612	CEXF1H109V	C ELECTRO	50V RSS 1MF (5X11) TP		SW10	5S50101Z90	SW TACT	THVV502GDA	
C613	CEXF1H109V	C ELECTRO	50V RSS 1MF (5X11) TP		SW11	5S50101Z90	SW TACT	THVV502GDA	
C614	CEXF1H109V	C ELECTRO	50V RSS 1MF (5X11) TP		X101	5XEX4R000C	CRYSTAL QUARTZ	HC-49/U 4.000MHZ 20PPM TP	
C615	CEXF1H109V	C ELECTRO	50V RSS 1MF (5X11) TP		ZA01	5PXF1B471M	FILTER EMI	CFI 06 B 1H 470PF	
C616	CEXF1H109V	C ELECTRO	50V RSS 1MF (5X11) TP		ZA02	5PXF1B471M	FILTER EMI	CFI 06 B 1H 470PF	
C617	CEXF1H109V	C ELECTRO	50V RSS 1MF (5X11) TP		ZA03	5PXF1B471M	FILTER EMI	CFI 06 B 1H 470PF	
C618	CBXF1H104Z	C CERA SEMI	50V F 0.1MF Z (TAPPING)		ZA04	5PXF1B471M	FILTER EMI	CFI 06 B 1H 470PF	
C619	CEXF1H339V	C ELECTRO	50V RSS 3.3MF (5X11) TP		ZA07	5PXF1B471M	FILTER EMI	CFI 06 B 1H 470PF	
C620	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP		ZA08	5PXF1B471M	FILTER EMI	CFI 06 B 1H 470PF	
C621	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP		ZA09	5PXF1B471M	FILTER EMI	CFI 06 B 1H 470PF	
C624	CEXF1E470V	C ELECTRO	25V RSS 47MF (5X11) TP		ZZ200	PTMPJAD572	PCB MAIN AXIAL AS	DDT-21H9ZZF	
C625	CEXF1E470V	C ELECTRO	25V RSS 47MF (5X11) TP		10	2TM10006LB	TAPE MASKING	3M #232-MAP-C 6.2X2000M	
C627	CBXF1H104Z	C CERA SEMI	50V F 0.1MF Z (TAPPING)		20	2TM14006LB	TAPE MASKING	3M #232 6.0X2000M	
C630	CMXM2A224J	C MYLAR	100V 0.22MF J		A001	4859805593	PCB MAIN	330X246 T1.6	

LOC	PARTS CODE	PARTS NAME	DESCRIPTION	REMARK	LOC	PARTS CODE	PARTS NAME	DESCRIPTION	REMARK
C102	CCZB1H102K	C CERA	50V B 1000PF K (AXIAL)		CA01	CBZR1C152M	C CERA	16V Y5R 1500PF M (AXIAL)	
C104	CCZF1H103Z	C CERA	50V F 0.01MF Z		CA02	CBZR1C152M	C CERA	16V Y5R 1500PF M (AXIAL)	
C105	CCZB1H101K	C CERA	50V B 100PF K (AXIAL)		CA05	CCZB1H101K	C CERA	50V B 100PF K (AXIAL)	
C106	CCZF1H103Z	C CERA	50V F 0.01MF Z		CA06	CCZB1H101K	C CERA	50V B 100PF K (AXIAL)	
C107	CCZF1H103Z	C CERA	50V F 0.01MF Z		CA07	CCZB1H101K	C CERA	50V B 100PF K (AXIAL)	
C108	CBZR1C152M	C CERA	16V Y5R 1500PF M (AXIAL)		CA08	CCZB1H102K	C CERA	50V B 1000PF K (AXIAL)	
C114	CCZF1H103Z	C CERA	50V F 0.01MF Z		CA11	CCZB1H471K	C CERA	50V B 470PF K (AXIAL)	
C116	CCZF1H103Z	C CERA	50V F 0.01MF Z		CA12	CCZB1H471K	C CERA	50V B 470PF K (AXIAL)	
C117	CCZB1H391K	C CERA	50V B 390PF K (AXIAL)		CA13	CCZB1H221K	C CERA	50V B 220PF K (AXIAL)	
C118	CCZF1H103Z	C CERA	50V F 0.01MF Z		CA14	CCZB1H221K	C CERA	50V B 220PF K (AXIAL)	
C119	CCZF1H103Z	C CERA	50V F 0.01MF Z		CQ01	CCZB1H221K	C CERA	50V B 220PF K (AXIAL)	
C121	CZSL1H220J	C CERA	50V SL 22PF J (AXIAL)		CQ03	CCZF1H103Z	C CERA	50V F 0.01MF Z	
C122	CCZF1H103Z	C CERA	50V F 0.01MF Z		D101	DBA282----	DIODE	BA282	
C501	CCZB1H221K	C CERA	50V B 220PF K (AXIAL)		D102	D1N4148---	DIODE	1N4148 (TAPPING)	
C502	CCZB1H221K	C CERA	50V B 220PF K (AXIAL)		D104	DUZ33B----	DIODE ZENER	UZ-33B	
C505	CCZF1H103Z	C CERA	50V F 0.01MF Z		D501	D1N4148---	DIODE	1N4148 (TAPPING)	
C507	CCZF1H103Z	C CERA	50V F 0.01MF Z		D502	D1N4148---	DIODE	1N4148 (TAPPING)	
C508	CCZF1H223Z	C CERA	50V F 0.022MF Z		D503	D1N4148---	DIODE	1N4148 (TAPPING)	
C509	CCZF1H223Z	C CERA	50V F 0.022MF Z		D504	D1N4148---	DIODE	1N4148 (TAPPING)	
C510	CCZF1H223Z	C CERA	50V F 0.022MF Z		D505	D1N4148---	DIODE	1N4148 (TAPPING)	
C513	CCZF1H473Z	C CERA	50V F 0.047MF Z		D506	D1N4148---	DIODE	1N4148 (TAPPING)	
C514	CCZF1H103Z	C CERA	50V F 0.01MF Z		D507	D1N4148---	DIODE	1N4148 (TAPPING)	
C525	CCZF1H103Z	C CERA	50V F 0.01MF Z		D508	D1N4148---	DIODE	1N4148 (TAPPING)	
C530	CCZF1H103Z	C CERA	50V F 0.01MF Z		D509	DUZ5R6BM--	DIODE ZENER	UZ-5.6BM	
C532	CCZF1H103Z	C CERA	50V F 0.01MF Z		D510	DUZ5R6BM--	DIODE ZENER	UZ-5.6BM	
C533	CCZB1H333K	C CERA	50V B 0.033MF K AXL		D511	DUZ5R6BM--	DIODE ZENER	UZ-5.6BM	
C534	CCZB1H333K	C CERA	50V B 0.033MF K AXL		D512	DUZ5R6BM--	DIODE ZENER	UZ-5.6BM	
C535	CCZB1H333K	C CERA	50V B 0.033MF K AXL		D513	D1N4148---	DIODE	1N4148 (TAPPING)	
C536	CCZB1H471K	C CERA	50V B 470PF K (AXIAL)		D514	D1N4148---	DIODE	1N4148 (TAPPING)	
C537	CCZB1H101K	C CERA	50V B 100PF K (AXIAL)		D515	DUZ8R2BM--	DIODE ZENER	UZ-8.2BM	
C538	CCZB1H471K	C CERA	50V B 470PF K (AXIAL)		D516	DUZ2R7B---	DIODE ZENER	UZ-2.7B	
C539	CCZB1H101K	C CERA	50V B 100PF K (AXIAL)		D517	D1N4148---	DIODE	1N4148 (TAPPING)	
C540	CCZB1H471K	C CERA	50V B 470PF K (AXIAL)		D601	D1N4148---	DIODE	1N4148 (TAPPING)	
C541	CCZB1H101K	C CERA	50V B 100PF K (AXIAL)		DA13	DUZ5R6BM--	DIODE ZENER	UZ-5.6BM	
C546	CCZF1H103Z	C CERA	50V F 0.01MF Z		J001	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	
C548	CCZF1H103Z	C CERA	50V F 0.01MF Z		J002	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	
C550	CCZF1H103Z	C CERA	50V F 0.01MF Z		J003	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	
C551	CBZR1C152M	C CERA	16V Y5R 1500PF M (AXIAL)		J004	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	
C555	CCZB1H101K	C CERA	50V B 100PF K (AXIAL)		J005	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	
C556	CCZB1H101K	C CERA	50V B 100PF K (AXIAL)		J006	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	
C557	CCZB1H101K	C CERA	50V B 100PF K (AXIAL)		J007	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	
C558	CCZB1H101K	C CERA	50V B 100PF K (AXIAL)		J008	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	
C560	CCZB1H151K	C CERA	50V B 150PF K (AXIAL)		J009	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	
C602	CCZF1H103Z	C CERA	50V F 0.01MF Z		J010	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	
C606	CZSL1H680J	C CERA	50V SL 68PF J (AXIAL)		J011	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	
C607	CZSL1H680J	C CERA	50V SL 68PF J (AXIAL)		J012	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	
C609	CCZF1H103Z	C CERA	50V F 0.01MF Z		J013	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	
C628	CBZR1C222M	C CERA	16V Y5R 2200PF M (AXIAL)		J014	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	
C629	CBZR1C222M	C CERA	16V Y5R 2200PF M (AXIAL)		J015	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	
C631	CCZB1H102K	C CERA	50V B 1000PF K (AXIAL)		J016	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	
C633	CCZB1H102K	C CERA	50V B 1000PF K (AXIAL)		J017	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	
C643	CCZB1H101K	C CERA	50V B 100PF K (AXIAL)		J018	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	
C644	CCZB1H101K	C CERA	50V B 100PF K (AXIAL)		J019	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	

[illegible]

LOC	PARTS CODE	PARTS NAME	DESCRIPTION	REMARK	LOC	PARTS CODE	PARTS NAME	DESCRIPTION	REMARK
J126	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING		R115	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
J127	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING		R116	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
J128	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING		R117	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
J129	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING		R118	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
J130	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING		R119	RD-2Z332J-	R CARBON FILM	1/2 3.3K OHM J	
J131	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING		R120	RD-AZ472J-	R CARBON FILM	1/6 4.7K OHM J	
J132	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING		R121	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
J133	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING		R122	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J	
J134	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING		R501	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
J135	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING		R502	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J	
J136	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING		R503	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
J137	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING		R504	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J	
J138	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING		R505	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
J139	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING		R506	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
J140	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING		R508	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
J141	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING		R509	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
J142	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING		R510	RD-AZ473J-	R CARBON FILM	1/6 47K OHM J	
J143	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING		R511	RD-AZ473J-	R CARBON FILM	1/6 47K OHM J	
J144	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING		R512	RD-AZ222J-	R CARBON FILM	1/6 2.2K OHM J	
J145	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING		R513	RD-AZ201J-	R CARBON FILM	1/6 200 OHM J	
J146	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING		R514	RD-AZ473J-	R CARBON FILM	1/6 47K OHM J	
J147	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING		R515	RD-AZ750J-	R CARBON FILM	1/6 75 OHM J	
J148	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING		R516	RD-AZ750J-	R CARBON FILM	1/6 75 OHM J	
J149	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING		R517	RD-AZ750J-	R CARBON FILM	1/6 75 OHM J	
J150	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING		R518	RD-AZ103J-	R CARBON FILM	1/6 10K OHM J	
J151	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING		R520	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J	
L101	5CPZ479K02	COIL PEAKING	4.7UH K (AXIAL 3.5MM)		R521	RD-AZ103J-	R CARBON FILM	1/6 10K OHM J	
L102	5CPZ479K02	COIL PEAKING	4.7UH K (AXIAL 3.5MM)		R524	RD-AZ223J-	R CARBON FILM	1/6 22K OHM J	
L501	5CPZ479K02	COIL PEAKING	4.7UH K (AXIAL 3.5MM)		R525	RD-AZ472J-	R CARBON FILM	1/6 4.7K OHM J	
L502	5CPZ479K02	COIL PEAKING	4.7UH K (AXIAL 3.5MM)		R527	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
L503	5CPZ689K02	COIL PEAKING	6.8UH K (AXIAL 3.5MM)		R528	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
L504	5CPZ479K02	COIL PEAKING	4.7UH K (AXIAL 3.5MM)		R529	RD-AZ222J-	R CARBON FILM	1/6 2.2K OHM J	
L505	5CPZ479K02	COIL PEAKING	4.7UH K (AXIAL 3.5MM)		R530	RD-AZ271J-	R CARBON FILM	1/6 270 OHM J	
L506	5CPZ479K02	COIL PEAKING	4.7UH K (AXIAL 3.5MM)		R531	RD-AZ122J-	R CARBON FILM	1/6 1.2K OHM J	
L507	5CPZ479K02	COIL PEAKING	4.7UH K (AXIAL 3.5MM)		R532	RD-AZ223J-	R CARBON FILM	1/6 22K OHM J	
L508	5CPZ479K02	COIL PEAKING	4.7UH K (AXIAL 3.5MM)		R533	RD-AZ103J-	R CARBON FILM	1/6 10K OHM J	
L601	5CPZ479K02	COIL PEAKING	4.7UH K (AXIAL 3.5MM)		R534	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
L602	5CPZ330K02	COIL PEAKING	33UH K (AXIAL 3.5MM)		R535	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
L604	5MC0000100	COIL BEAD	HC-3550		R536	RD-AZ682J-	R CARBON FILM	1/6 6.8K OHM J	
R101	RD-AZ222J-	R CARBON FILM	1/6 2.2K OHM J		R537	RD-AZ682J-	R CARBON FILM	1/6 6.8K OHM J	
R102	RD-AZ222J-	R CARBON FILM	1/6 2.2K OHM J		R538	RD-AZ330J-	R CARBON FILM	1/6 33 OHM J	
R103	RD-AZ682J-	R CARBON FILM	1/6 6.8K OHM J		R539	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
R104	RD-AZ473J-	R CARBON FILM	1/6 47K OHM J		R540	RD-AZ221J-	R CARBON FILM	1/6 220 OHM J	
R105	RD-AZ223J-	R CARBON FILM	1/6 22K OHM J		R541	RD-AZ330J-	R CARBON FILM	1/6 33 OHM J	
R106	RD-AZ223J-	R CARBON FILM	1/6 22K OHM J		R542	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
R107	RD-AZ223J-	R CARBON FILM	1/6 22K OHM J		R543	RD-AZ221J-	R CARBON FILM	1/6 220 OHM J	
R108	RD-AZ223J-	R CARBON FILM	1/6 22K OHM J		R544	RD-AZ330J-	R CARBON FILM	1/6 33 OHM J	
R109	RD-AZ331J-	R CARBON FILM	1/6 330 OHM J		R545	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
R110	RD-AZ331J-	R CARBON FILM	1/6 330 OHM J		R546	RD-AZ221J-	R CARBON FILM	1/6 220 OHM J	
R111	RD-AZ123J-	R CARBON FILM	1/6 12K OHM J		R547	RD-AZ181J-	R CARBON FILM	1/6 180 OHM J	
R112	RD-AZ104J-	R CARBON FILM	1/6 100K OHM J		R548	RD-AZ181J-	R CARBON FILM	1/6 180 OHM J	
R113	RD-AZ752J-	R CARBON FILM	1/6 7.5K OHM J		R549	RD-AZ181J-	R CARBON FILM	1/6 180 OHM J	
R114	RD-AZ562J-	R CARBON FILM	1/6 5.6K OHM J		R550	RD-AZ220J-	R CARBON FILM	1/6 22 OHM J	

LOC	PARTS CODE	PARTS NAME	DESCRIPTION	REMARK	LOC	PARTS CODE	PARTS NAME	DESCRIPTION	REMARK
R551	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J		RA15	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
R552	RD-AZ682J-	R CARBON FILM	1/6 6.8K OHM J		RQ01	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
R553	RD-AZ222J-	R CARBON FILM	1/6 2.2K OHM J		RQ02	RD-AZ153J-	R CARBON FILM	1/6 15K OHM J	
R554	RD-AZ103J-	R CARBON FILM	1/6 10K OHM J		RQ03	RD-AZ122J-	R CARBON FILM	1/6 1.2K OHM J	
R555	RD-AZ472J-	R CARBON FILM	1/6 4.7K OHM J		RQ04	RD-AZ122J-	R CARBON FILM	1/6 1.2K OHM J	
R556	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J		RQ05	RD-AZ103J-	R CARBON FILM	1/6 10K OHM J	
R557	RD-AZ223J-	R CARBON FILM	1/6 22K OHM J		RQ07	RD-AZ181J-	R CARBON FILM	1/6 180 OHM J	
R558	RD-AZ473J-	R CARBON FILM	1/6 47K OHM J		RQ08	RD-AZ221J-	R CARBON FILM	1/6 220 OHM J	
R559	RD-AZ473J-	R CARBON FILM	1/6 47K OHM J		RQ09	RD-AZ331J-	R CARBON FILM	1/6 330 OHM J	
R560	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J		RQ10	RD-AZ471J-	R CARBON FILM	1/6 470 OHM J	
R561	RD-AZ222J-	R CARBON FILM	1/6 2.2K OHM J		RQ12	RD-AZ181J-	R CARBON FILM	1/6 180 OHM J	
R562	RD-AZ473J-	R CARBON FILM	1/6 47K OHM J		RQ13	RD-AZ221J-	R CARBON FILM	1/6 220 OHM J	
R563	RD-AZ473J-	R CARBON FILM	1/6 47K OHM J		RQ14	RD-AZ331J-	R CARBON FILM	1/6 330 OHM J	
R566	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J		RQ15	RD-AZ471J-	R CARBON FILM	1/6 470 OHM J	
R567	RD-AZ201J-	R CARBON FILM	1/6 200 OHM J		RQ16	RD-AZ181J-	R CARBON FILM	1/6 180 OHM J	
R568	RD-AZ471J-	R CARBON FILM	1/6 470 OHM J		RQ17	RD-AZ331J-	R CARBON FILM	1/6 330 OHM J	
R569	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J		RQ18	RD-AZ181J-	R CARBON FILM	1/6 180 OHM J	
R570	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J		RQ19	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J	
R571	RD-AZ471J-	R CARBON FILM	1/6 470 OHM J		RQ20	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J	
R601	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J		RQ21	RD-AZ103J-	R CARBON FILM	1/6 10K OHM J	
R602	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J		RQ22	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J	
R603	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J		ZZ300	PTPWMSD572	PCB POWER MANUAL AS	DDT-21H9ZZF	
R604	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J		10	2193102005	SOLDER BAR	SN:PB=63:47 S63S-1320	
R605	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J		30	2291050616	FLUX SOLDER	JS-64T3	
R606	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J		40	2291050301	FLUX SOLVENT	IM-1000	
R607	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J		C408	CMYH3C752J	C MYLAR	1.6KV BUP 7500PF J	
R608	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J		C409	CMYE2D304J	C MYLAR	200V PU 0.3MF J	
R609	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J		C411	CMYE2G273J	C MYLAR	400V PU 0.027MF J	
R610	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J		C412	CEYD1H689W	C ELECTRO	50V RHD 6.8MF (16X35.5)	
R611	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J		C413	CEYF2D101V	C ELECTRO	200V RSS 100MF (16X31.5)	
R612	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J	⚠	C801	CL1UC3474M	C LINE ACROSS	0.47MF 1J(UCVSNDF/SV)+Q/O	
R613	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J		C807	CEYN2G181P	C ELECTRO	400V LHS 180MF (25X35)	
R614	RD-AZ133J-	R CARBON FILM	1/6 13K OHM J		C815	CH1BFE472M	C CERA AC	AC400V 4700PF M U/C/V	
R615	RD-AZ472J-	R CARBON FILM	1/6 4.7K OHM J		C818	CCYR3A471K	C CERA	1KV R 470PF K 125 DE0705	
R616	RD-AZ133J-	R CARBON FILM	1/6 13K OHM J		C819	CCYR3A471K	C CERA	1KV R 470PF K 125 DE0705	
R617	RD-AZ472J-	R CARBON FILM	1/6 4.7K OHM J		C820	CEYF2D101V	C ELECTRO	200V RSS 100MF (16X31.5)	
R621	RD-AZ562J-	R CARBON FILM	1/6 5.6K OHM J		D405	DDG3-----	DIODE	DG3	
R622	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J		D406	DRGP30J---	DIODE	RGP30J	
R623	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J		D814	DRGP30J---	DIODE	RGP30J	
RA01	RD-AZ473J-	R CARBON FILM	1/6 47K OHM J		D815	PTP2SW6900	HEAT SINK ASS'Y	DFMLG12S-- + 7174300811	
RA02	RD-AZ473J-	R CARBON FILM	1/6 47K OHM J		00001	DFMLG12S--	DIODE	FML-G12S	
RA03	RD-AZ750J-	R CARBON FILM	1/6 75 OHM J		0000A	4857026900	HEAT SINK	AL EX	
RA04	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J		0000B	7174300811	SCREW TAPPTITE	TT2 RND 3X8 MFZN	
RA05	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J		D816	PTP2SW6900	HEAT SINK ASS'Y	DFMLG12S-- + 7174300811	
RA06	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J		00001	DFMLG12S--	DIODE	FML-G12S	
RA07	RD-AZ750J-	R CARBON FILM	1/6 75 OHM J		0000A	4857026900	HEAT SINK	AL EX	
RA08	RD-AZ750J-	R CARBON FILM	1/6 75 OHM J		0000B	7174300811	SCREW TAPPTITE	TT2 RND 3X8 MFZN	
RA09	RD-AZ750J-	R CARBON FILM	1/6 75 OHM J		D817	DRGP30J---	DIODE	RGP30J	
RA10	RD-AZ333J-	R CARBON FILM	1/6 33K OHM J		D818	DRGP30J---	DIODE	RGP30J	
RA11	RD-AZ113J-	R CARBON FILM	1/6 11K OHM J		I301	PTA2SW4422	HEAT SINK ASS'Y	1TDA8358J- + 7174301011	
RA12	RD-AZ680J-	R CARBON FILM	1/6 68 OHM J	®	I301	1TDA8358J-	IC VERTICAL	TDA8358J	
RA13	RD-AZ750J-	R CARBON FILM	1/6 75 OHM J		I301A	4857024422	HEAT SINK	AL EX	
RA14	RD-AZ750J-	R CARBON FILM	1/6 75 OHM J		I301B	7174300811	SCREW TAPPTITE	TT2 RND 3X8 MFZN	

LOC	PARTS CODE	PARTS NAME	DESCRIPTION	REMARK
I801	PTA2SW6110	HEAT SINK ASS'Y	1STRF6654 + 7174300811	
I801	1STRF6654-	IC SMPS	STR-F6654	Ⓡ
I801A	4857026110	HEAT SINK	AL EX	
I801B	7174301011	SCREW TAPPTITE	TT2 RND 3X10 MFZN	
I802	1TNY253P--	IC	TNY253P	
I803	1KP1010C--	IC PHOTO COUPLER	KP-1010C	⚠
I804	1KP1010C--	IC PHOTO COUPLER	KP-1010C	⚠
I805	PTB3SW1203	HEAT SINK ASS'Y	1LD1117A33 + 1K1A7806P1 + 7174300811	
00001	1LD1117A33	IC REGULATOR	LD1117A 3.3V	
0000A	4857031203	HEAT SINK	AL 6063S	
0000B	7174300811	SCREW TAPPTITE	TT2 RND 3X8 MFZN	
0000C	1K1A7806P1	IC REGULATOR	KIA7806API	
0000D	1K1A7805P1	IC REGULATOR	KIA7805API	
I806	1LD1117A25	IC REGULATOR	LD1117A 2.5V	
I809	1DP142----	IC ERROR AMP	DP142	Ⓡ
I810	1L7808CV--	IC REGULATOR	L7808CV	
I811	1L7812CV--	IC REGULATOR	10W 3.3 OHM J TRIPOD	
I901	PTB2SW5403	HEAT SINK ASS'Y	1TEA5101B- + 7174300811	
I901	1TEA5101B-	IC VIDEO AMP	TEA5101B	Ⓡ
I901A	4857025403	HEAT SINK	AL050P-H24 T=2	
I901B	7174300811	SCREW TAPPTITE	TT2 RND 3X8 MFZN	
JPA2	4859105450	JACK PIN BOARD	YSC03P-4120-9S	
JPA3	4859105240	JACK PHONE	LGT1516-0100	
L401	58H0000073	COIL H-LINEARITY	TRL-131B	
L402	58C0000122	COIL CHOKE	CH-401B	
L802	5PLF24A3--	FILTER LINE	LF-24A3	
M232	4852328701	PANEL AV	ABS GY 21L6	
M232A	7178301011	SCREW TAPPTITE	TT2 WAS 3X10 MFZN	
M352	4853535500	HOLDER CORD	NYLON 66	
M381	4853818500	FRAME POWER	FR HIPS BK 21H9	
M381A	7178301212	SCREW TAPPTITE	TT2 WAS 3X12 MFZN BK	
P401	4859242420	CONN WAFER	YFW800-04	
P5101	4859235520	CONN WAFER	YW025-12	
P801	4859287320	CONN WAFER	MKS2822-6-10-202	
P802	4859242220	CONN WAFER	YFW800-02	
P803	4859235520	CONN WAFER	YW025-12	
PA502	4850712V08	CONNECTOR	YH025-12+YBNH250+ULW=300	
PA901	4850704S03	CONNECTOR	YH025-04+YST025+ULW=300	
PWC1	PTWBSW7410	CORD POWER ASS'Y	906111+HOUSING+TUBE+17700	
PW000	4859906111	CORD POWER	M5206+H03VVH2-F=2250	
PW001	4857417700	TERM CLAMP	PT-01-T3	
Q402	PTN2SW4500	HEAT SINK ASS'Y	T2SD2578-- + 7174300811	
00001	T2SD2578--	TR	2SD2578	Ⓡ
0000A	4857024500	HEAT SINK	AL EX B/K	
0000B	7174300811	SCREW TAPPTITE	TT2 RND 3X8 MFZN	
R801	RX10T339J-	R CEMENT	10W 3.3 OHM J TRIPOD	Ⓡ
R802	DPC7R0M290	POSISTOR	2322 662 96709	
R811	RF02Y158K-	R FUSIBLE	2W 0.15 OHM K	
R823	RS02Y688JS	R M-OXIDE FILM	2W 0.68 OHM J SMALL	
R919	RS01Y399J-	R M-OXIDE FILM	1W 3.9 OHM J	
SCT01	4859304130	SOCKET CRT	ISHG93S	⚠
T401	50D10A2---	TRANS DRIVE	TD-10A2	
T402	50H0000235	FBT	1352.5060	⚠ Ⓡ

LOC	PARTS CODE	PARTS NAME	DESCRIPTION	REMARK
T801	50M4445B1-	TRANS SMPS	TSM-4445B1	⚠
T802	50MST16A1-	TRANS SMPS	ST-16A1	⚠
Y801	5SC0101339	SW RELAY	SDT-S-105LMR	
ZZ200	PTPWJD572	PCB POWER ODD SHAPE	DDT-21H9ZZF	
C309	CEXF2A470C	C ELECTRO	100V RUS 47MF (10X16) TP	
C404	CEXF2E100V	C ELECTRO	250V RSS 10MF (10X20) TP	
C804	CEXF2W100V	C ELECTRO	450V RSS 10MF (13X20) TP	
C821	CEXF1C102V	C ELECTRO	16V RSS 1000MF (10X20) TP	
C822	CEXF1C102C	C ELECTRO	16V RUS 1000MF (10X20) TP	
C823	CEXF1C102C	C ELECTRO	16V RUS 1000MF (10X20) TP	
C824	CEXF1C102V	C ELECTRO	16V RSS 1000MF (10X20) TP	
C834	CEXF1C471C	C ELECTRO	16V RUS 470MF (10X12.5)TP	
C844	CEXF1C102V	C ELECTRO	16V RSS 1000MF (10X20) TP	
C848	CEXF1C102V	C ELECTRO	16V RSS 1000MF (10X20) TP	
C904	CEXF2E100V	C ELECTRO	250V RSS 10MF (10X20) TP	
C908	CBXB3D102K	C CERA SEMI	2KV BL(N) 1000PF K (T)	
C909	CEXF2E100V	C ELECTRO	250V RSS 10MF (10X20) TP	
F802	5FWML4022L	FUSE	WIDE TL 250V 4A CASE	⚠
ZZ200	PTPWJD572	PCB POWER M-10 AS	DDT-21H9ZZF	
10	2TM18006BE	TAPE MASKING	6.2X500	
E001	4856310300	EYE LET	BSR T0.2 (R1.6)	
E002	4856310300	EYE LET	BSR T0.2 (R1.6)	
E004	4856310300	EYE LET	BSR T0.2 (R1.6)	
E006	4856310600	EYE LET	BSR T0.2 (R2.3)	
E007	4856310600	EYE LET	BSR T0.2 (R2.3)	
E008	4856310600	EYE LET	BSR T0.2 (R2.3)	
E009	4856310600	EYE LET	BSR T0.2 (R2.3)	
E010	4856310300	EYE LET	BSR T0.2 (R1.6)	
E011	4856310600	EYE LET	BSR T0.2 (R2.3)	
E012	4856310600	EYE LET	BSR T0.2 (R2.3)	
E013	4856310300	EYE LET	BSR T0.2 (R1.6)	
E014	4856310600	EYE LET	BSR T0.2 (R2.3)	
E015	4856310300	EYE LET	BSR T0.2 (R1.6)	
E016	4856310300	EYE LET	BSR T0.2 (R1.6)	
E017	4856310300	EYE LET	BSR T0.2 (R1.6)	
E019	4856310300	EYE LET	BSR T0.2 (R1.6)	
E021	4856310300	EYE LET	BSR T0.2 (R1.6)	
E022	4856310300	EYE LET	BSR T0.2 (R1.6)	
E023	4856310300	EYE LET	BSR T0.2 (R1.6)	
E024	4856310300	EYE LET	BSR T0.2 (R1.6)	
E025	4856310600	EYE LET	BSR T0.2 (R2.3)	
E026	4856310600	EYE LET	BSR T0.2 (R2.3)	
E027	4856310300	EYE LET	BSR T0.2 (R1.6)	
E028	4856310600	EYE LET	BSR T0.2 (R2.3)	
E029	4856310600	EYE LET	BSR T0.2 (R2.3)	
E030	4856310600	EYE LET	BSR T0.2 (R2.3)	
E033	4856310600	EYE LET	BSR T0.2 (R2.3)	
E034	4856310600	EYE LET	BSR T0.2 (R2.3)	
E035	4856310600	EYE LET	BSR T0.2 (R2.3)	
E036	4856310600	EYE LET	BSR T0.2 (R2.3)	
E037	4856310300	EYE LET	BSR T0.2 (R1.6)	
E038	4856310300	EYE LET	BSR T0.2 (R1.6)	
E039	4856310300	EYE LET	BSR T0.2 (R1.6)	

LOC	PARTS CODE	PARTS NAME	DESCRIPTION	REMARK	LOC	PARTS CODE	PARTS NAME	DESCRIPTION	REMARK
P501	485923192S	CONN WAFER	YW025-06 (STICK)		R413	RN02B479JS	R METAL FILM	2W 4.7 OHM J SMALL	
P804	485923522S	CONN WAFER	YW025-09 (STICK)		R414	RN02B151JS	R METAL FILM	2W 150 OHM J SMALL	
P901	485923172S	CONN WAFER	YW025-04 (STICK)		R415	RN02B151JS	R METAL FILM	2W 150 OHM J SMALL	
ZZ200	PTPWJRD572	PCB POWER RADIAL AS	DDT-21H9ZZF		R416	RN02B151JS	R METAL FILM	2W 150 OHM J SMALL	
C303	CEXF1E221V	C ELECTRO	25V RSS 220MF (8X11.5) TP		R806	RN02B683JS	R METAL FILM	2W 68K OHM J SMALL	
C304	CBXF1H104Z	C CERA SEMI	50V F 0.1MF Z (TAPPING)		R818	RN02B369JS	R METAL FILM	2W 3.6 OHM J SMALL	
C305	CEXF2C229V	C ELECTRO	160V RSS 2.2MF (8X11.5)TP		R819	RN02B159JS	R METAL FILM	2W 1.5 OHM J SMALL	
C306	CMXM2A224J	C MYLAR	100V 0.22MF J		R829	RN02B150JS	R METAL FILM	2W 15 OHM J SMALL	
C307	CCXF1H473Z	C CERA	50V F 0.047MF Z (TAPPING)		R830	RN02B109JS	R METAL FILM	2W 1 OHM J SMALL	
C310	CMXM2A104J	C MYLAR	100V 0.1MF J (TP)		R907	RN02B683JS	R METAL FILM	2W 68K OHM J SMALL	
C311	CMXM2A473J	C MYLAR	100V 0.047MF J (TP)		R908	RN02B683JS	R METAL FILM	2W 68K OHM J SMALL	
C401	CCXB2H222K	C CERA	500V B 2200PF K (TAPPING)		R909	RN02B683JS	R METAL FILM	2W 68K OHM J SMALL	
C402	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP		Z601	5PXF1B471M	FILTER EMI	CFI 06 B 1H 470PF	
C403	CCXB1H102K	C CERA	50V B 1000PF K (TAPPING)		Z602	5PXF1B471M	FILTER EMI	CFI 06 B 1H 470PF	
C405	CMXM2A104J	C MYLAR	100V 0.1MF J (TP)		ZA05	5PXF1B471M	FILTER EMI	CFI 06 B 1H 470PF	
C406	CCXB2H101K	C CERA	500V B 100PF K (TAPPING)		ZA06	5PXF1B471M	FILTER EMI	CFI 06 B 1H 470PF	
C410	CEXF2C339C	C ELECTRO	160V RUS 3.3MF (8X11.5) TP		ZZ200	PTPWJAD572	PCB POWER AXIAL AS	DDT-21H9ZZF	
C636	CEXF1H479V	C ELECTRO	50V RSS 4.7MF (5X11) TP		10	2TM10006LB	TAPE MASKING	3M #232-MAP-C 6.2X2000M	
C637	CEXF1H479V	C ELECTRO	50V RSS 4.7MF (5X11) TP		20	2TM14006LB	TAPE MASKING	3M #232 6.0X2000M	
C802	CCXF3A472Z	C CERA	1KV F 4700PF Z (T)		A001	4859813711	PCB POWER	246X246 T1.6	
C803	CCXF3A472Z	C CERA	1KV F 4700PF Z (T)		C301	CCZF1H103Z	C CERA	50V F 0.01MF Z	
C805	CCXB2H101K	C CERA	500V B 100PF K (TAPPING)		C302	CCZF1H103Z	C CERA	50V F 0.01MF Z	
C806	CBXF1H104Z	C CERA SEMI	50V F 0.1MF Z (TAPPING)		C308	CCZB1H681K	C CERA	50V B 680PF K (AXIAL)	
C808	CCXF3A472Z	C CERA	1KV F 4700PF Z (T)		C813	CBZR1C152M	C CERA	16V Y5R 1500PF M (AXIAL)	
C809	CCXF3A472Z	C CERA	1KV F 4700PF Z (T)		C814	CCZB1H102K	C CERA	50V B 1000PF K (AXIAL)	
C810	CEXF1E470V	C ELECTRO	25V RSS 47MF (5X11) TP		C827	CCZF1H103Z	C CERA	50V F 0.01MF Z	
C811	CEXF1H479V	C ELECTRO	50V RSS 4.7MF (5X11) TP		C829	CCZF1H103Z	C CERA	50V F 0.01MF Z	
C816	CCXB2H101K	C CERA	500V B 100PF K (TAPPING)		C831	CCZF1H103Z	C CERA	50V F 0.01MF Z	
C817	CCXF1H473Z	C CERA	50V F 0.047MF Z (TAPPING)		C832	CCZF1H103Z	C CERA	50V F 0.01MF Z	
C825	CEXF1E470V	C ELECTRO	25V RSS 47MF (5X11) TP		C835	CCZF1H103Z	C CERA	50V F 0.01MF Z	
C833	CEXF1H220V	C ELECTRO	50V RSS 22MF (5X11) TP		C837	CCZF1H103Z	C CERA	50V F 0.01MF Z	
C836	CEXF1E101V	C ELECTRO	25V RSS 100MF (6.3X11) TP		C839	CCZF1H103Z	C CERA	50V F 0.01MF Z	
C838	CEXF1E101V	C ELECTRO	25V RSS 100MF (6.3X11) TP		C841	CCZF1H103Z	C CERA	50V F 0.01MF Z	
C840	CEXF1E101V	C ELECTRO	25V RSS 100MF (6.3X11) TP		C849	CCZF1H103Z	C CERA	50V F 0.01MF Z	
C842	CBXF1H104Z	C CERA SEMI	50V F 0.1MF Z (TAPPING)		C851	CCZF1H103Z	C CERA	50V F 0.01MF Z	
C843	CEXF1E101V	C ELECTRO	25V RSS 100MF (6.3X11) TP		C901	CCZB1H471K	C CERA	50V B 470PF K (AXIAL)	
C845	CEXF1H479V	C ELECTRO	50V RSS 4.7MF (5X11) TP		C902	CCZB1H471K	C CERA	50V B 470PF K (AXIAL)	
C850	CEXF1E101V	C ELECTRO	25V RSS 100MF (6.3X11) TP		C903	CCZB1H471K	C CERA	50V B 470PF K (AXIAL)	
C905	CMXL2E104K	C MYLAR	250V MEU 0.1MF K		CA03	CCZB1H471K	C CERA	50V B 470PF K (AXIAL)	
C906	CEXF1E470V	C ELECTRO	25V RSS 47MF (5X11) TP		CA04	CCZB1H471K	C CERA	50V B 470PF K (AXIAL)	
L404	58CX430599	COIL CHOKE	AZ-9004Y 940K TP		D301	D1N4937G--	DIODE	1N4937G (TAPPING)	
L804	58CX430599	COIL CHOKE	AZ-9004Y 940K TP		D302	D1N4937G--	DIODE	1N4937G (TAPPING)	
Q401	TKTC3209Y-	TR	KTC3209Y		D303	D1N4937G--	DIODE	1N4937G (TAPPING)	
Q801	TKSA1013Y-	TR	KSA1013Y (TP)		D304	DUZ22BM---	DIODE ZENER	UZ-22BM	
Q802	TKTC3203Y-	TR	KTC3203-Y		D305	DUZ33B----	DIODE ZENER	UZ-33B	
R311	RN02B159JS	R METAL FILM	2W 1.5 OHM J SMALL		D306	DUZ33B----	DIODE ZENER	UZ-33B	
R313	RN02B151JS	R METAL FILM	2W 150 OHM J SMALL		D402	D1N4004S--	DIODE	1N4004S	
R315	RN02B151JS	R METAL FILM	2W 150 OHM J SMALL		D403	D1N4937G--	DIODE	1N4937G (TAPPING)	
R405	RN02B473JS	R METAL FILM	2W 47K OHM J SMALL		D404	D1N4937G--	DIODE	1N4937G (TAPPING)	
R406	RN02B222JS	R METAL FILM	2W 2.2K OHM J SMALL		D801	DLT2A05G--	DIODE	LT2A05G (TP)	
R409	RN02B222JS	R METAL FILM	2W 2.2K OHM J SMALL		D802	DLT2A05G--	DIODE	LT2A05G (TP)	
R410	RN02B103JS	R METAL FILM	2W 10K OHM J SMALL		D803	DLT2A05G--	DIODE	LT2A05G (TP)	
R411	RN02B479JS	R METAL FILM	2W 4.7 OHM J SMALL		D804	DLT2A05G--	DIODE	LT2A05G (TP)	

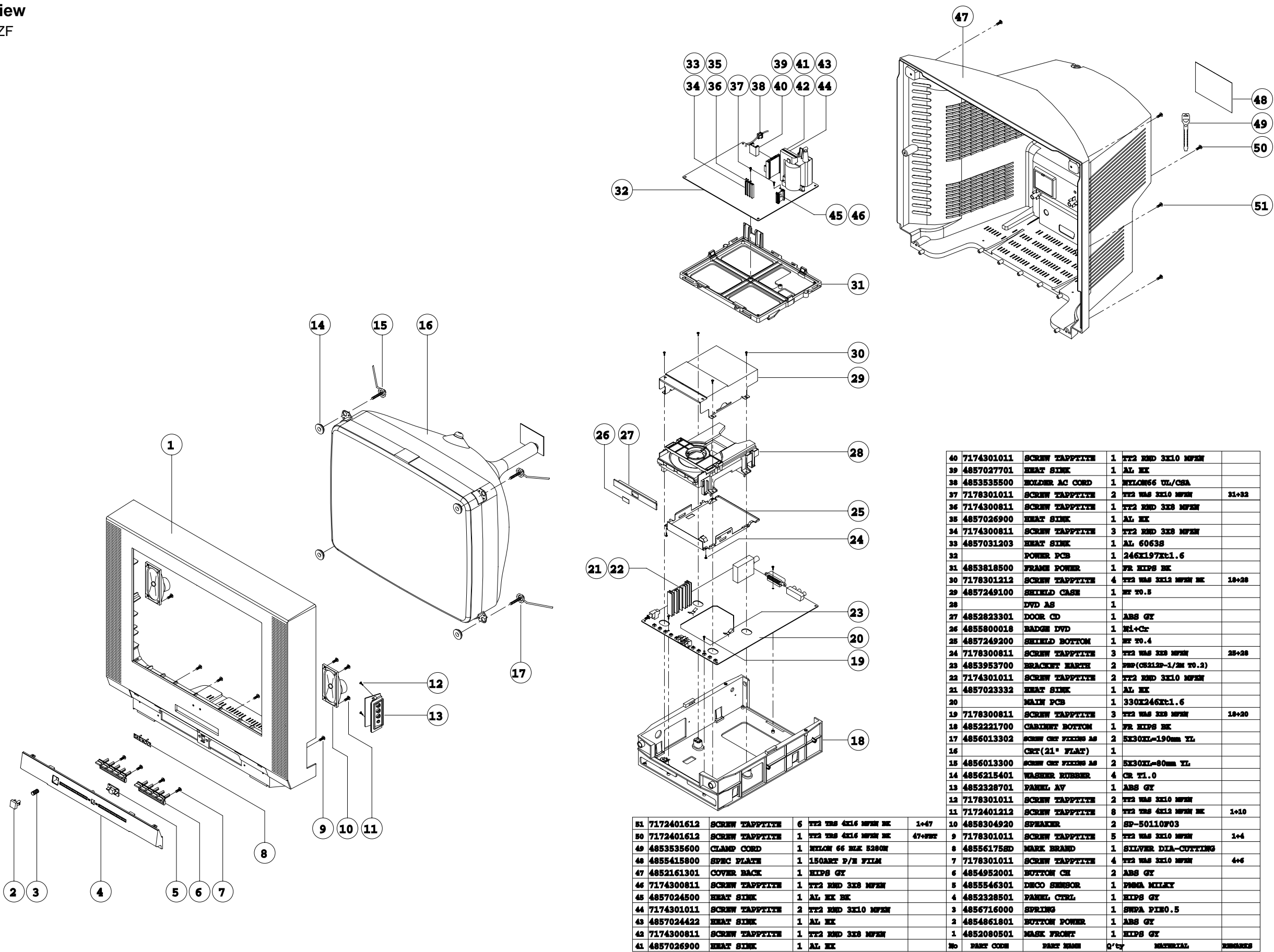
LOC	PARTS CODE	PARTS NAME	DESCRIPTION	REMARK	LOC	PARTS CODE	PARTS NAME	DESCRIPTION	REMARK
D805	DUZ5R6BM--	DIODE ZENER	UZ-5.6BM		J036	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	
D806	DLT2A05G--	DIODE	LT2A05G (TP)		J037	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	
D807	DLT2A05G--	DIODE	LT2A05G (TP)		J038	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	
D808	DLT2A05G--	DIODE	LT2A05G (TP)		J039	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	
D809	DLT2A05G--	DIODE	LT2A05G (TP)		J040	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	
D810	D1N4937G--	DIODE	1N4937G (TAPPING)		J041	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	
D811	D1N4937G--	DIODE	1N4937G (TAPPING)		J042	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	
D812	D1N4937G--	DIODE	1N4937G (TAPPING)		J043	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	
D813	D1N4937G--	DIODE	1N4937G (TAPPING)		J045	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	
D819	DRGP15J---	DIODE	RGP15J		J046	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	
D821	DUZ5R6BM--	DIODE ZENER	UZ-5.6BM		J047	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	
D823	D1N4937G--	DIODE	1N4937G (TAPPING)		J048	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	
D824	DUZ4R3B---	DIODE ZENER	UZ-4R3B		J049	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	
D825	D1N4148---	DIODE	1N4148 (TAPPING)		J050	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	
D828	DRGP15J---	DIODE	RGP15J		J051	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	
D901	DLT2A05G--	DIODE	LT2A05G (TP)		J052	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	
D902	D1N4937G--	DIODE	1N4937G (TAPPING)		J053	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	
DA01	DUZ5R6BM--	DIODE ZENER	UZ-5.6BM		J054	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	
J001	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING		L301	5CPZ100K04	COIL PEAKING	10UH 10.5MM K (LAL04TB)	
J002	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING		L302	5CPZ100K04	COIL PEAKING	10UH 10.5MM K (LAL04TB)	
J003	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING		L803	5MC0000100	COIL BEAD	HC-3550	
J004	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING		L805	5MC0000100	COIL BEAD	HC-3550	
J005	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING		L806	5CPZ109M04	COIL PEAKING	1UH 10.5MM M (LAL04TB)	
J006	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING		R301	RN-4Z2701F	R METAL FILM	1/4 2.70K OHM F	
J007	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING		R302	RN-4Z2701F	R METAL FILM	1/4 2.70K OHM F	
J008	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING		R303	RD-AZ392J-	R CARBON FILM	1/6 3.9K OHM J	
J009	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING		R304	RD-AZ392J-	R CARBON FILM	1/6 3.9K OHM J	
J010	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING		R305	RD-AZ683J-	R CARBON FILM	1/6 68K OHM J	
J011	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING		R306	RD-AZ272J-	R CARBON FILM	1/6 2.7K OHM J	
J012	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING		R307	RD-AZ272J-	R CARBON FILM	1/6 2.7K OHM J	
J013	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING		R308	RD-4Z474J-	R CARBON FILM	1/4 470K OHM J	
J014	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING		R309	RD-4Z182J-	R CARBON FILM	1/4 1.8K OHM J	
J015	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING		R310	RD-4Z159J-	R CARBON FILM	1/4 1.5 OHM J	
J016	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING		R312	RD-4Z473J-	R CARBON FILM	1/4 47K OHM J	
J017	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING		R401	RD-4Z472J-	R CARBON FILM	1/4 4.7K OHM J	
J018	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING		R402	RD-AZ681J-	R CARBON FILM	1/6 680 OHM J	
J019	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING		R403	RD-4Z272J-	R CARBON FILM	1/4 2.7K OHM J	
J020	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING		R404	RD-4Z220J-	R CARBON FILM	1/4 22 OHM J	
J021	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING		R407	RD-4Z273J-	R CARBON FILM	1/4 27K OHM J	
J022	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING		R408	RD-4Z333J-	R CARBON FILM	1/4 33K OHM J	
J023	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING		R412	RD-4Z220J-	R CARBON FILM	1/4 22 OHM J	
J024	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING		R618	RD-2Z300J-	R CARBON FILM	1/2 30 OHM J	
J025	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING		R619	RD-2Z300J-	R CARBON FILM	1/2 30 OHM J	
J026	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING		R803	RD-2Z101J-	R CARBON FILM	1/2 100 OHM J	
J027	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING		R804	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J	
J028	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING		R805	RD-AZ751J-	R CARBON FILM	1/6 750 OHM J	
J029	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING		R807	RD-4Z272J-	R CARBON FILM	1/4 2.7K OHM J	
J030	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING		R808	RD-4Z472J-	R CARBON FILM	1/4 4.7K OHM J	
J031	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING		R809	RD-4Z100J-	R CARBON FILM	1/4 10 OHM J	
J032	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING		R810	RD-4Z821J-	R CARBON FILM	1/4 820 OHM J	
J033	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING		R812	RC-2Z824KP	R CARBON COMP	1/2 820K OHM K	
J034	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING		R815	RC-2Z565KP	R CARBON COMP	1/2 5.6M OHM K	
J035	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING		R821	RD-4Z102J-	R CARBON FILM	1/4 1K OHM J	

LOC	PARTS CODE	PARTS NAME	DESCRIPTION	REMARK	LOC	PARTS CODE	PARTS NAME	DESCRIPTION	REMARK
R822	RD-4Z102J-	R CARBON FILM	1/4 1K OHM J						
R824	RD-4Z363J-	R CARBON FILM	1/4 36K OHM J						
R825	RD-AZ623J-	R CARBON FILM	1/6 62K OHM J						
R826	RD-AZ472J-	R CARBON FILM	1/6 4.7K OHM J						
R827	RD-AZ472J-	R CARBON FILM	1/6 4.7K OHM J						
R828	RD-AZ473J-	R CARBON FILM	1/6 47K OHM J						
R831	RD-2Z474J-	R CARBON FILM	1/2 470K OHM J						
R901	RD-2Z102J-	R CARBON FILM	1/2 1K OHM J						
R902	RD-2Z102J-	R CARBON FILM	1/2 1K OHM J						
R903	RD-2Z102J-	R CARBON FILM	1/2 1K OHM J						
R904	RD-AZ471J-	R CARBON FILM	1/6 470 OHM J						
R905	RD-AZ471J-	R CARBON FILM	1/6 470 OHM J						
R906	RD-AZ471J-	R CARBON FILM	1/6 470 OHM J						
R910	RD-AZ472J-	R CARBON FILM	1/6 4.7K OHM J						
R911	RD-AZ472J-	R CARBON FILM	1/6 4.7K OHM J						
R912	RD-AZ472J-	R CARBON FILM	1/6 4.7K OHM J						
R913	RD-AZ431J-	R CARBON FILM	1/6 430 OHM J						
R914	RD-AZ431J-	R CARBON FILM	1/6 430 OHM J						
R915	RD-AZ431J-	R CARBON FILM	1/6 430 OHM J						
R916	RD-AZ272J-	R CARBON FILM	1/6 2.7K OHM J						
R917	RD-AZ272J-	R CARBON FILM	1/6 2.7K OHM J						
R918	RD-AZ272J-	R CARBON FILM	1/6 2.7K OHM J						
R920	RD-2Z102J-	R CARBON FILM	1/2 1K OHM J						
R921	RD-2Z105J-	R CARBON FILM	1/2 1M OHM J						
R922	RD-4Z100J-	R CARBON FILM	1/4 10 OHM J						

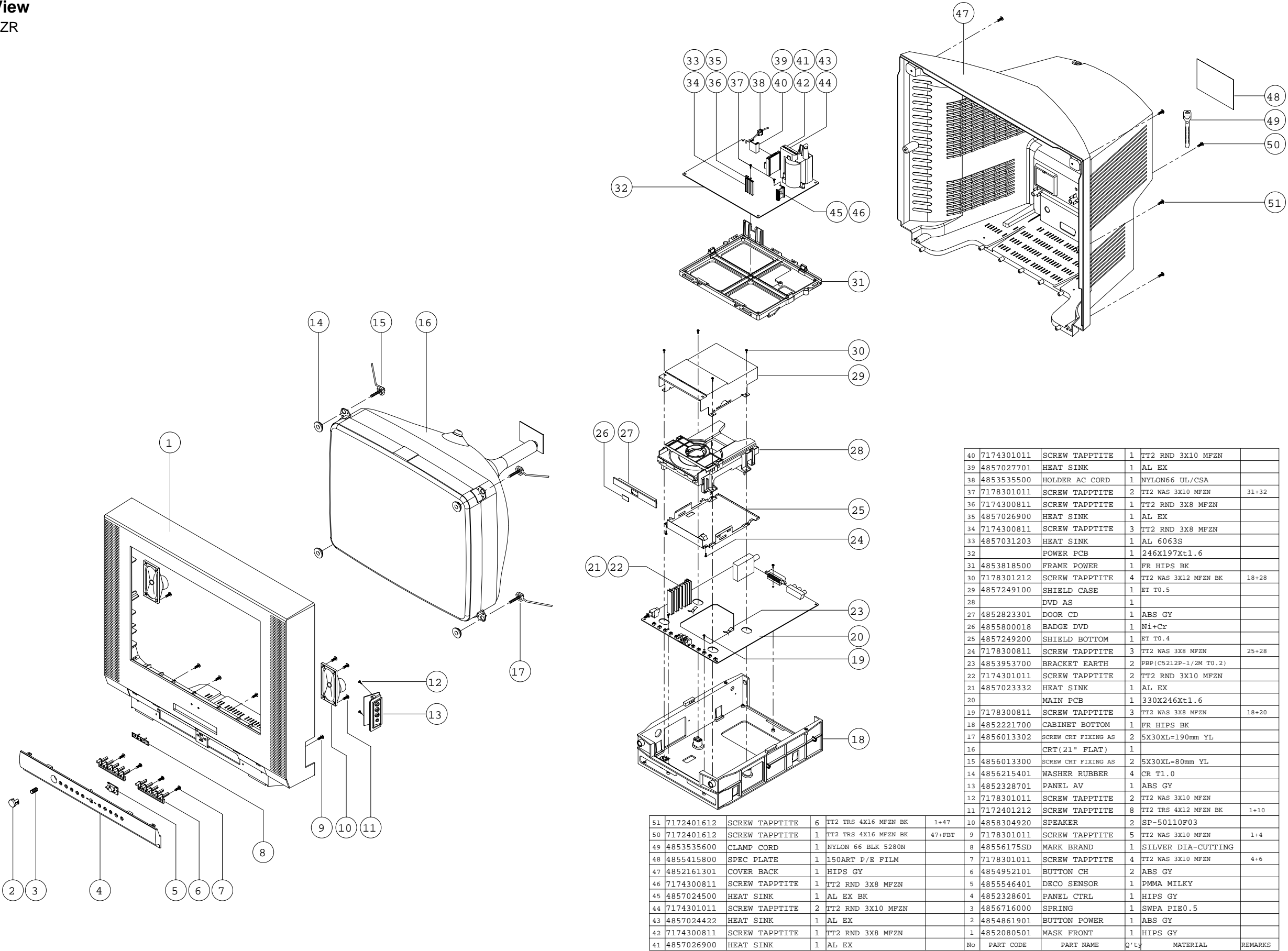
7. DIFFERENT PARTS LIST BY CRT

NO	LOC	PART NON PIN PREE	PHILIPS 21" PIN PREE	PHILIPS 21"
1	V901	CRT	A51ERF135X70	A51ERF135X80
2	C408	C MYLAR	1.6KV 7500PF	1.6KV 6000PF
3	C409	C MYLAR	200V 0.3MF	200V 0.33MF
4	L401	COIL H-LINEA	TRF-131B	NEW
5	L402	COIL CHOKE	CH-401B	X
6	L403	COIL CHOKE	X	CH-191A
7	J053	WIRE COPPER	JUMPER	X
8	J017	WIRE COPPER	JUMPER	X
9	J023	WIRE COPPER	JUMPER	X
10	D406	DIODE	PGP30J	X
11	C411	C MYLAR	400V 0.027MF	JUMPER
12	C412	C ELECTRO	50V 6.8MF RHD	X
13	R411	R METAL FILM	2W 4.7	X
14	R413	R METAL FILM	2W 4.7	X
15	R305	R CORBON FILM	1/6 68K	X
16				

8. Exploded View
8-1 DDT-21H9ZZF

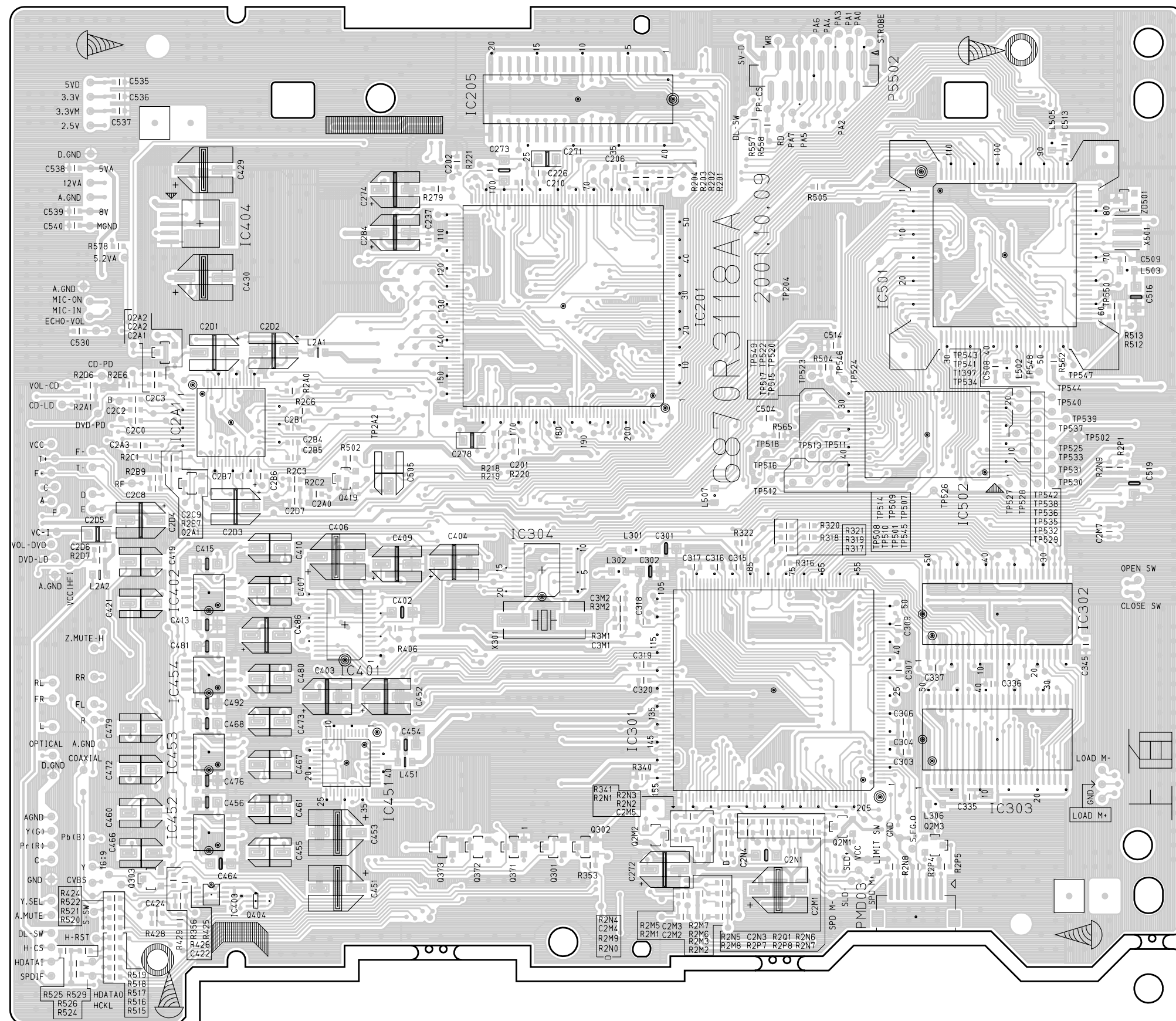


7. Exploded View
8-2 DDT-21H9ZZR

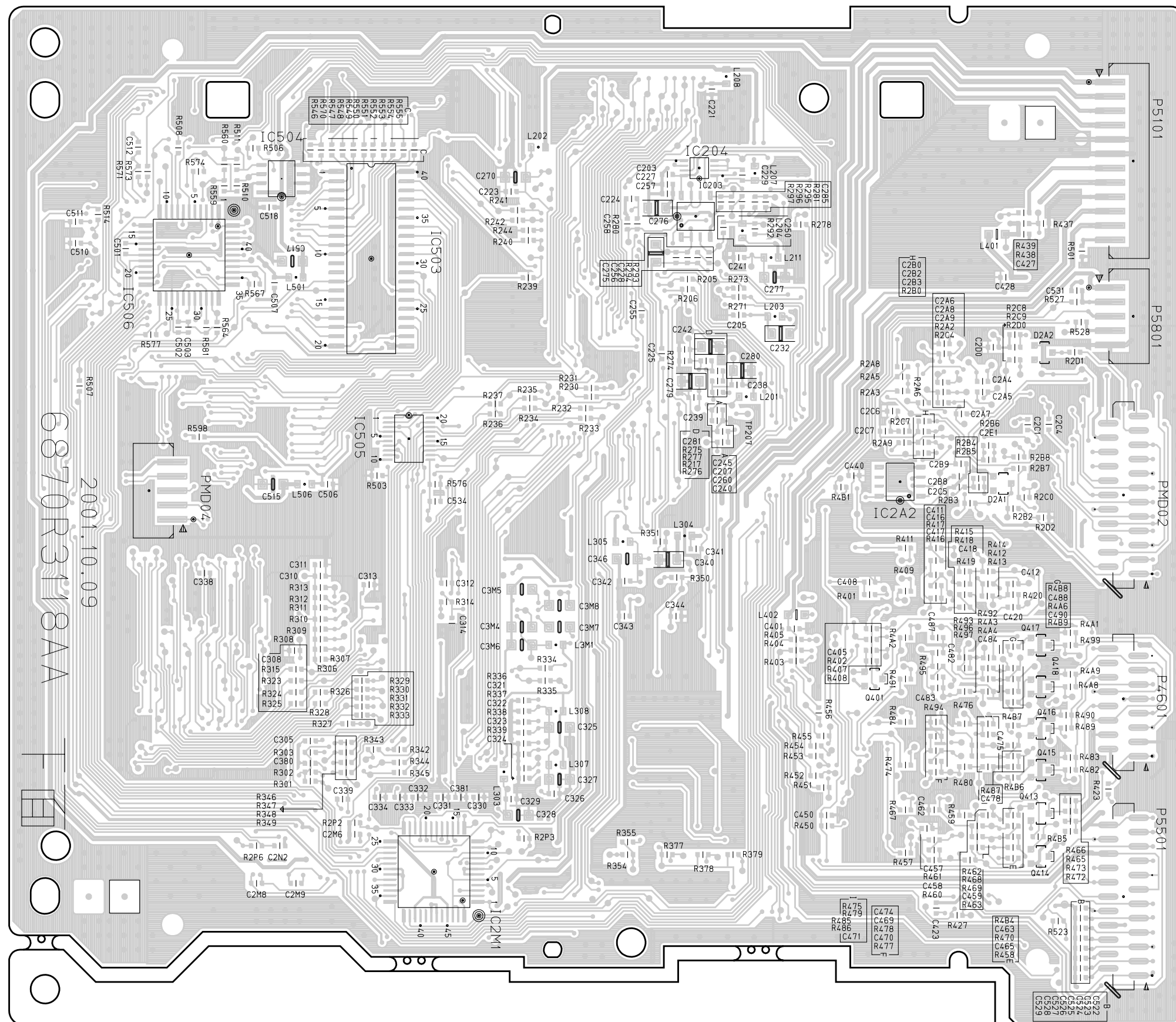


9. PRINTED CIRCUIT BOARD

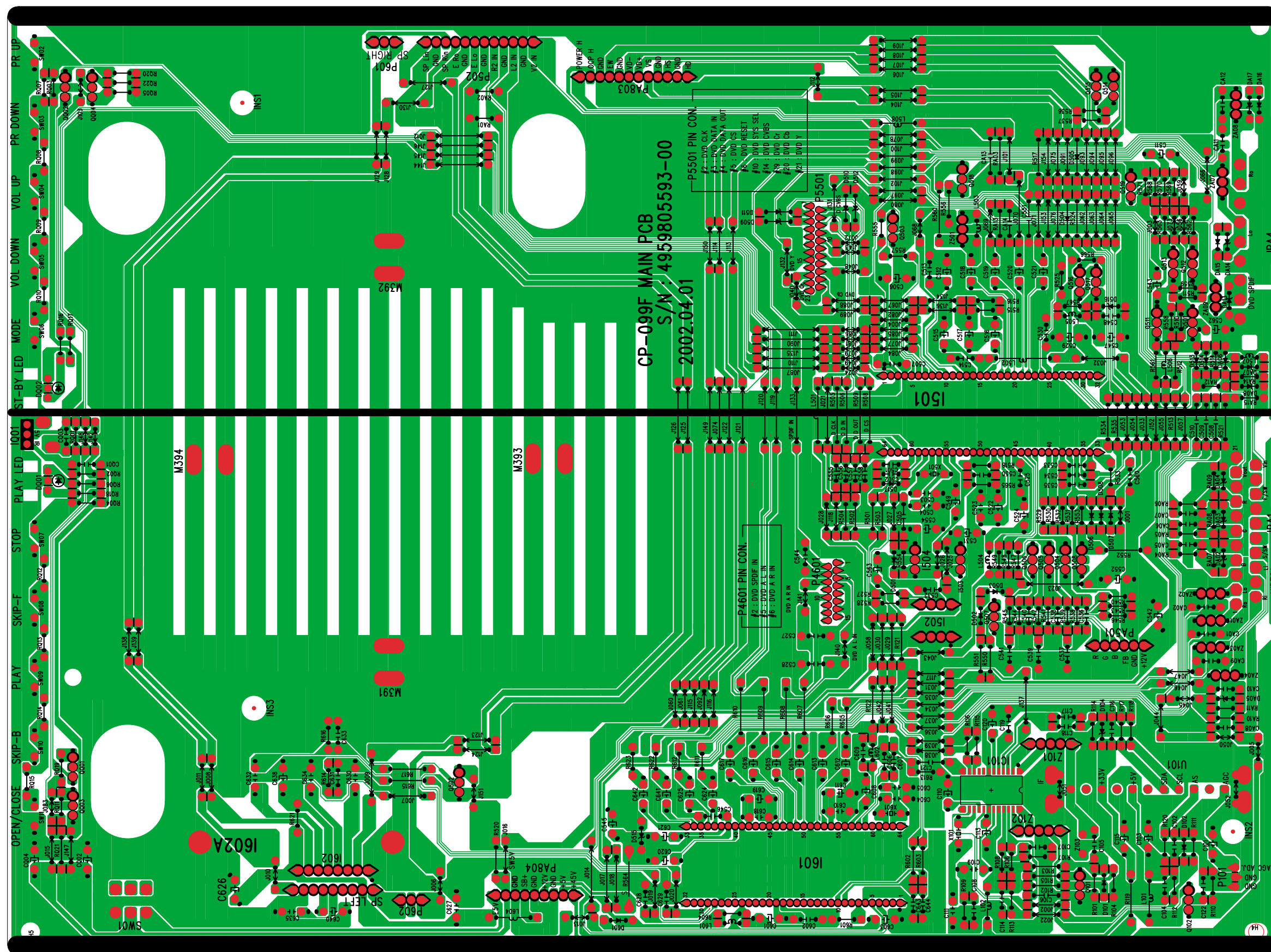
9-1 DVD PCB (The upper)




9-2 DVD PCB (The lower)

















10. SCHEMATIC DIAGRAM
10-1 POWER / CRT




PRODUCT SAFETY NOTE :
THE COMPONENTS MARKED WITH  ARE IMPORTANT FOR MAINTAINING THE SAFETY OF THE SET AND SHOULD BE REPLACED ONLY WITH TYPES IDENTICAL TO THOSE IN THE ORIGINAL OR SPECIFIED ONE IN THE PART LIST. DON'T DEGRADE THE SAFETY OF THE SET THROUGH IMPROPER SERVICING.

NOTE:
1. RESISTANCE IS SHOWN IN OHM. K=1000, M=1000000
2. UNLESS OTHERWISE NOTED IN SCHEMATIC ALL CAPACITOR VALUES ARE EXPRESSED IN P
3. VOLTAGES READ WITH "VTVM" FROM POINT INDICATED TO CHASSIS GROUND USING A COLOR BAR SIGNAL WITH ALL CONTROLS AT NORMAL LINE 230V AC VOLTAGE READINGS SHOWN ARE NORMAL VALUES AND MAY VARY +20% EXCEPT H.V
4. THIS CIRCUIT DIAGRAM IS A STANDARD ONE CIRCUIT PRINTED MAY BE SUBJECT TO CHANGE FOR PRODUCT IMPROVEMENT WITHOUT PRIOR NOTICE

WARNING:
BEFORE SERVICING THE CHASSIS, READ "X-RAY RADIATION", "SAFETY PRECAUTION", AND "PRODUCT SAFETY NOTICE" IN SERVICE MANUAL

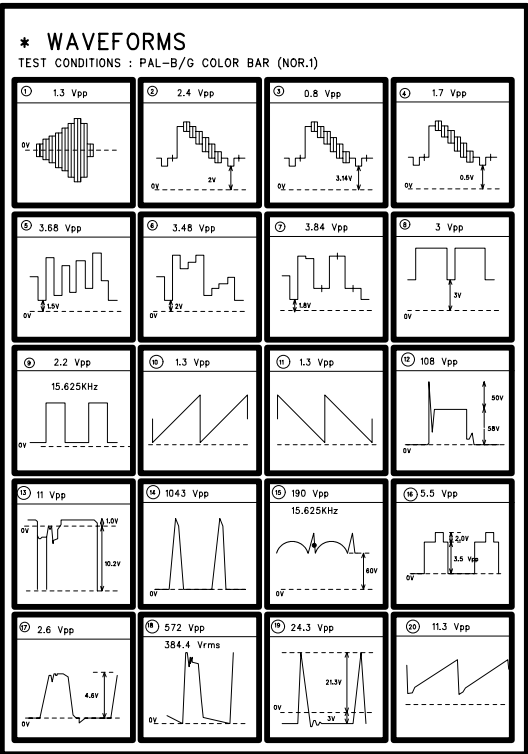
CAUTION TO SERVICE TECHNICIANS:
BEFORE RETURNING THE RECEIVER TO CUSTOMER, LEAKAGE CURRENT OR RESISTANCE MEASUREMENTS SHOULD BE PERFORMED TO DETERMINE THAT EXPOSED PARTS ARE PROPERLY INSULATED FROM THE SUPPLY CIRCUIT.

RESISTOR		CAPACITOR	
CARBON FILM		ELECTRO	
R-M-OXIDE		CERAMIC	
CARBON COMP		CERAMIC CH	
FUSIBLE		ELECTRO NONPOLAR	
CEMENT		MYLAR	

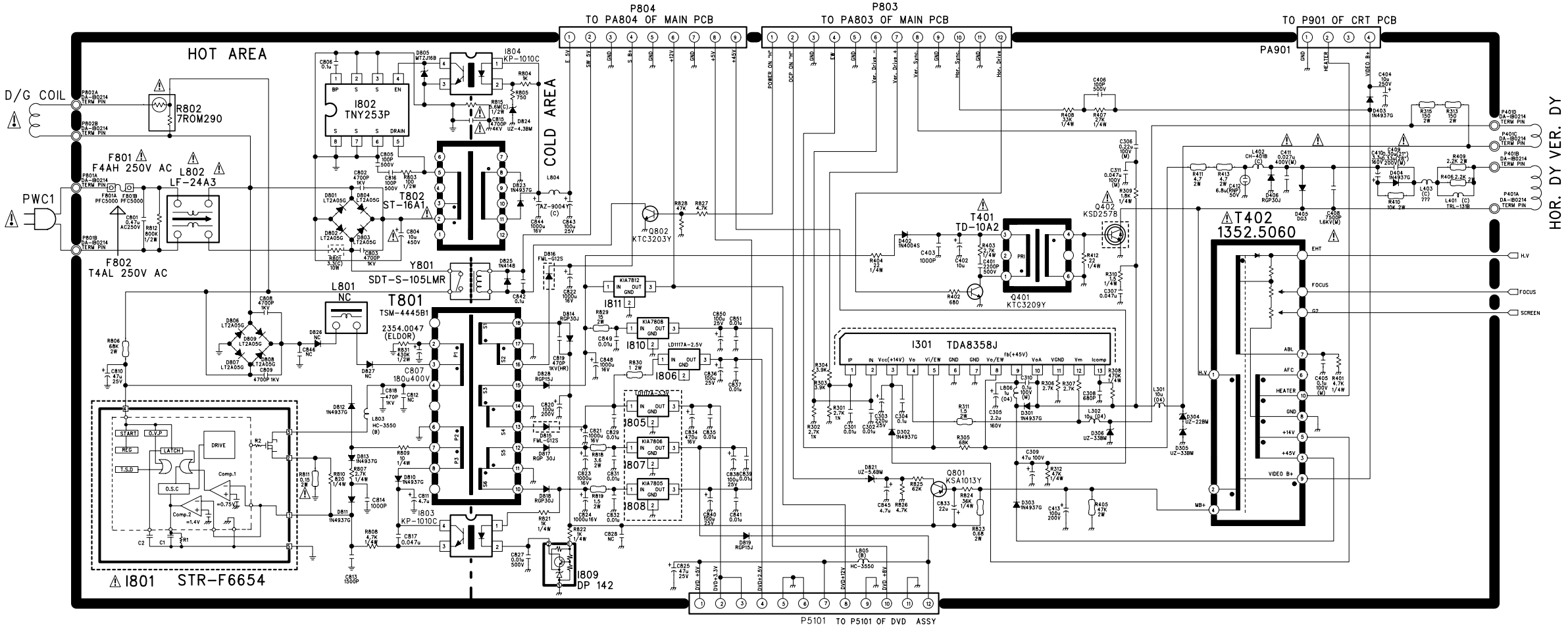
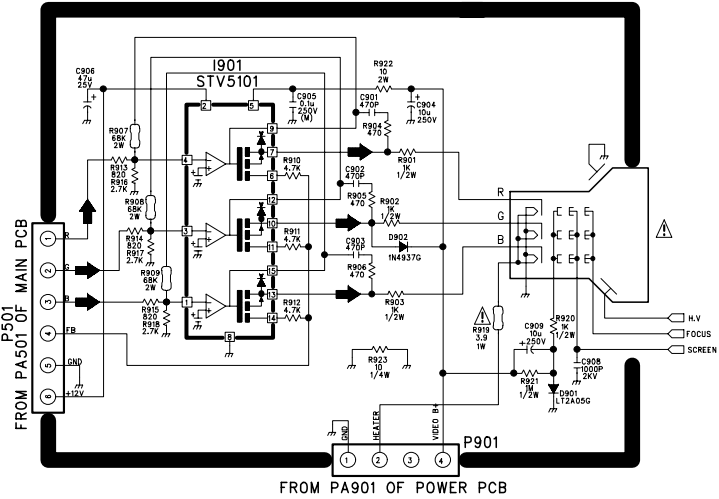
COIL	
PEAKING	
CHOKE	
BEAD	

DRAWN	DESIGNED	CHECKED	APPROVED	CHASSIS	CP-099F
S.H.KANG	C.S.KO	H.K. CHOI	H.R. PARK	FILE NAME	13711-MP
30.APR.2002				ISSUED	
				REVISED	
DESIGNER	3TIP	C.S.KO	REV No.	SHEET	2/2
DAEWOO ELECTRONICS TV RESEARCH CENTER				SCHEM No.	

DIFFERENT PARTS FOR CRT					
NO	LOC	PART	PHILIPS 21" NON PIN FREE	PHILIPS 21" PIN FREE	
1	V901	CRT	A518NF135X70	A518NF135180	
2	C408	C MYLAR	16KV 7500PF	16KV 6000PF	
3	C409	C MYLAR	220V 0.3MF	200V 0.3MF	
4	L401	COIL H-LINEA	TRF-131B	NEW	
5	L402	COIL CHOKE	CH-401B	X	
6	L403	COIL CHOKE	X	CH-191A	
7	J053	WIRE COPPER	JUMPER	X	
8	J017	WIRE COPPER	JUMPER	X	
9	J023	WIRE COPPER	JUMPER	X	
10	D406	DICKE	RGP30J	X	
11	C411	C MYLAR	400V 0.027MF	JUMPER	
12	C412	C ELECTRO	55V 6.8MF RHD	X	
13	R411	R METAL FILM	2W 4.7	X	
14	R413	R METAL FILM	2W 4.7	X	
15	R305	R CARBON FILM	1/6 88K	X	



CP-099F PWR/CRT
SCHEMATIC DIAGRAM





DAEWOO
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